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A Multi-Stakeholder Roadmap for Care Transformation – the AHRQ evidence-based Care Transformation Support (ACTS) Initiative

S43: Panel

Agenda/Presenters

AHRQ's Goals, Context and Process for ACTS

- Moderator: Steve Bernstein: AHRQ

Panelists

ACTS Consensus Future Vision and Roadmap for Achieving it

- Jerry Osheroff: ACTS Stakeholder Community, Project Team; TMIT Consulting

How the ACTS LHS-related Goals Align with CDC's Goals of Improving the Public's Health

- Maria Michaels: MedMorph, Adapting Clinical Guidelines for the Digital Age; CDC

Using Standards to Realize the ACTS Vision

- Brian Alper: EBM on FHIR, COKA; Computable Publishing

Putting Computable Knowledge Into Action to Achieve the ACTS Vision

- Blackford Middleton: C19 Digital Guidelines Workgroup; Apervita

Please use Q&A tab to enter comments/questions for presenters

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AHRQ's Goals, Context and Process for ACTS

Panel S43: A Multi-Stakeholder Roadmap for Care Transformation – the AHRQ evidence-based Care Transformation Support (ACTS) Initiative

Steve Bernstein

Senior Advisor for Digital Healthcare, Agency for Healthcare Policy and Research (AHRQ)

ACTS Project Officer

Disclosure

I and my spouse have no relevant relationships with commercial interests to disclose.

Panel Goal and Learning Objectives

Goal

- Build on the dialogue and collaboration reflected in the ACTS Initiative to benefit more organizations from this work and accelerate widespread progress toward the future vision.

After participating in this session the learner should be better able to:

- Describe the virtuous learning health system cycle enabled by a robust knowledge ecosystem, and
- Understand how the ACTS Initiative and Roadmap may benefit their organization in transforming care.

AHRQ's Mission and Challenge

Mission:

- Produce evidence to make health care safer, higher quality, more accessible, equitable, and affordable.
- Work within the US DHHS and with other partners to make sure that the evidence is understood and used.

Challenge:

- AHRQ (and others) produce many valuable, evidence-informed resources to support care delivery and transformation and LHSs
- *However*, these resources are not used as widely or effectively as they could be by those who could benefit significantly from them -
- *Because*, they are aren't findable, accessible, interoperable, re-usable…

ACTS Objectives

- Establish requirements for AHRQ Digital Knowledge Platform; make AHRQ resources more FAIR (*Findable, Accessible, Interoperable, and Reusable*), computable, useful
- Ensure this platform interoperates seamlessly with other public and private knowledge platforms in integrated knowledge ecosystem to improve knowledge creation, interoperability and use at point of need
- Build stakeholder-driven Roadmap to ensure AHRQ Digital Knowledge Platform and knowledge ecosystem support AHRQ mission and priorities, enable learning health systems to achieve quadruple aim

ACTS Context: Problems Addressed

- $ Billions/year spent on care evidence/ guidance/ tools that aren't optimally accessed/used/useful
- Efforts to address this are fragmented/ siloed and without clear path to a comprehensive solution
- Care Delivery Stakeholders can't get information when/where and how it's needed

Waste from Poor Info Flow

- $210 billion wasted on unnecessary services and $130 billion on inefficient services/year (1)
- 80-90% Healthcare costs influenced by physician decisions (2)

Sub-Optimal Patient Outcomes

- NEJM - patients get only 50% recommended care (3)
- Preventable harm results in many deaths/day (4)

Clinician Burnout

- Physician turnover/reduced clinical hours costs $ billions/ year,lowers care quality (5)
- "public health crisis: … pressure to meet quality measures without resources/support" (6)

*__Recoverable__ Waste in the US Health Care System (7)

Healthcare Waste Domain	Savings/Year from Measures to Eliminate Waste
Care Delivery	$44.4 billion to $93.3 billion
Care Coordination	$29.6 billion to $38.2 billion
Over-treatment or low-value care	$12.8 billion to $28.6 billion

Total = $86.8B-$160.1B/Year

(1) Hung; Healthcare Leadership; 2018;July15; (2) Crosson; Commentary The Commonwealth Fund 2009;April 27 ; (3) McGlynn NEJM 2003;348:2635-45 ; (4) Bernazzani; Costs of Care; 2015;Oct 5
(5) Han; ACP Annals of Internal Medicine; 2019; June 4 (6) Vajracharya;Physician Burnout: A Public Health Crisis" panel; 2018; April 4 ; (7) Shrank; JAMA 2019;322(15):1501-1509 ;

ACTS Approach

- Stakeholder Community and Workgroups to produce Roadmap
- Current State vs. Future Vision
- Stakeholder-driven actions AHRQ / others can take
- Volunteer Stakeholder Community Effort
- Coordinated with other related activities

ACTS Stakeholder Community
(n = 268* as of 10/26/20)

AMIA
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Care Delivery Organizations (79)

- Adventist Healthcare
- ASU
- Cedars-Sinai
- Children's Hospital of Atlanta (2)
- Children's Hospital of Philadelphia
- City of Hope National Medical Center
- Emory University
- George Washington University
- Harvard Medical School/BWH
- HealthPartners
- Hennepin Healthcare
- Inova Health System (2)
- Intermountain Healthcare (3)
- Kaiser Permanente
- Kittitas Valley Healthcare
- Lehigh Valley Health Network
- Mayo Clinic (4)
- Montefiore Medical Center
- Northwestern Medicine
- Oregon Health & Science University (2)
- Peninsula Regional Med Center (2)
- RWJBarnabas Health/Rutgers Health
- Sparrow Health
- Texas Health Resources
- University of Chicago/ Cochrane US Network (2)
- University of Arizona
- University of Kansas Medical Center
- University of Minnesota (4)
- University of Pennsylvania Medicine (3)
- University of Utah (5)
- University of Washington
- VA (17)
- Vanderbilt University Medical Center (9)
- Virginia Commonwealth University (2)
- Virginia Mason Medical Center

Quality Organizations/ Consultants (38)

- Advanced Health Outcomes
- Arizona Alliance for Community Health Centers
- BHB Clinical Informatics
- BookZurman
- Clinical Informatics
- Database Consulting Group
- EBQ Consulting
- ecGroup Inc.
- Fusion Consulting
- HLN Consulting
- Interoperability Institute
- IPRO (2)
- JBI (2)
- KLAS
- Klesis Healthcare
- Mathematica
- MITRE (2)
- NACHC (2)
- NCQA (7)
- Overhage
- Premier
- Principled Strategies
- RTI (4)
- sEA Healthcare
- Stratis Health

HIT/CDS Suppliers (43)

- AgileMD
- AiCPG
- Apervita (2)
- Cerner (2)
- Clinical Architecture
- Clinical Cloud Solutions
- Computable Publishing
- Crisp Health
- Decisions/UMN
- EHRA/Allscripts
- Elimu Informatics, Inc.
- Epic (2)
- EvidenceCare (4)
- Health Catalyst (2)
- Healthwise (2)
- International Guidelines Center
- Intersystems (2)
- Logica (2)
- MAGIC Evidence Ecosystem Foundation (2)
- Medisolv Inc.
- Meditech (2)
- Microsoft (2)
- Motive Medical Intelligence
- Optum
- Semedy
- Triostech
- Verily Life Sciences
- Visible Systems Corporation
- Wolters Kluwer

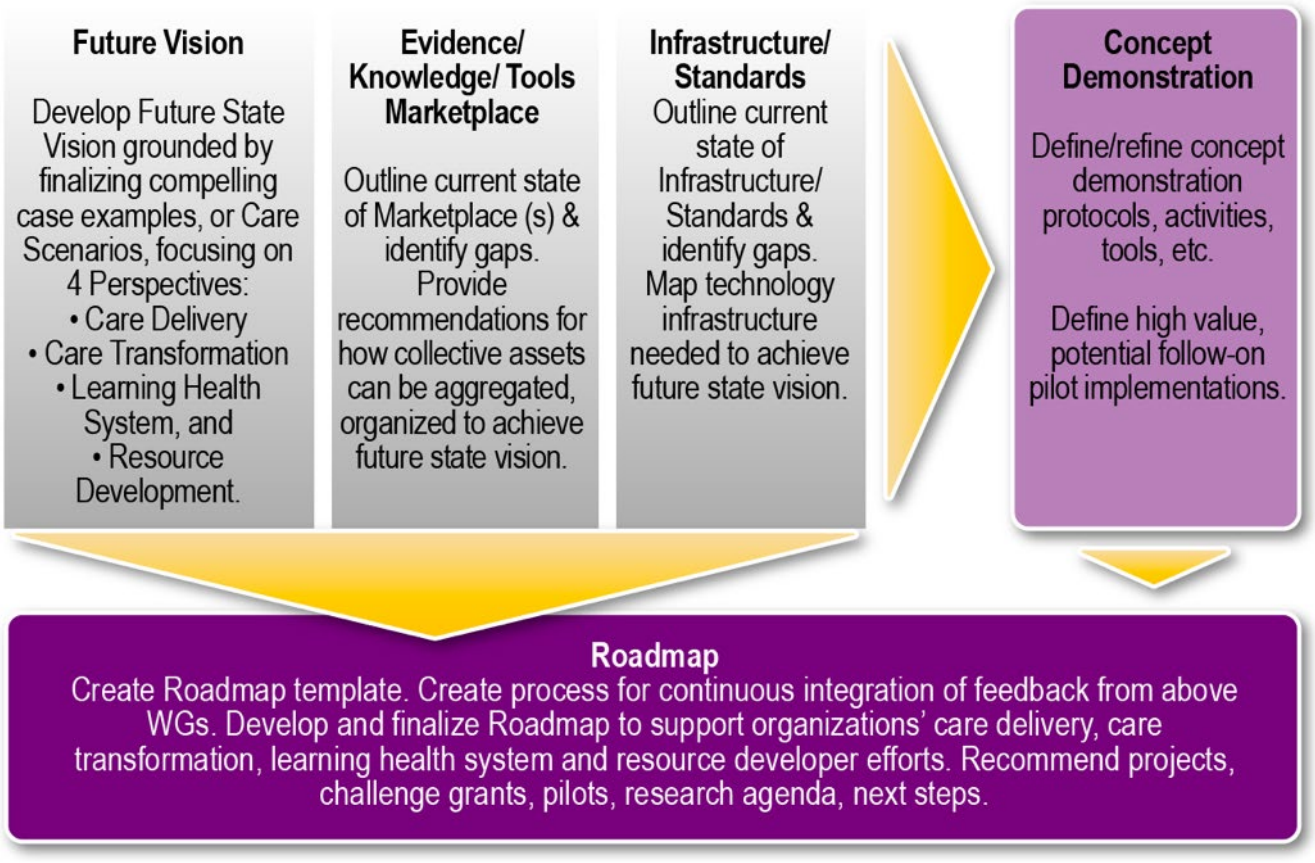
*Names in parentheses are counted elsewhere; numbers in parentheses are individuals

ACTS Stakeholder Community - Continued
(n = 268* as of 10/26/20)

Informatics/ Researchers (16)	Specialty Societies (14)	Patient Advocates (3)	Other Govt Agencies (17)	AHRQ (37)	Payers (2)	Other (19)
• Brown University EPC • Duke University • Idaho State University • Indiana University • Johns Hopkins EPC • (Mayo Clinic) • Stanford University • UCSF • University of Michigan (4) • University of Pittsburgh (2) • (University of Utah) • UT Health at San Antonio • UT Southwestern • (Vanderbilt University) • West Virginia University	• AAFP • AAP (3) • ACCME (2) • ACEP (3) • ACP • AMA • AMIA (2) • Society of Critical Care Medicine	• Health-Hats • Engaging Patient Strategy • Patient Safety Action Network	• CDC (4) • CMS (5) • Idaho Dept of Health • NIDDK - NIH (2) • NLM - NIH • ONC (2) • Pima County Health Department • (VA) • Washington State Dept of Health	• Center for Evidence & Practice Improvement (26) • Center for Financing, Access and Cost Trends (5) • Center for Quality & Patient Safety (1) • Office of Management Services (3) • ACTS Project (2)	• (CMS) • BCBS CA • BCBSMN	• Australia Living Guideline Initiative (2) • COVID-END • ECRI Institute • HL7 • Jodi Wachs • Librarian Reserve Corp • L*VE/Epistemonikos • McMaster (2) • Mike Campbell • OMG/BPM+ • OHRI • UK National Health Service • University of Melbourne (5)

*Names in parentheses are counted elsewhere; numbers in parentheses are individuals

ACTS Stakeholder Workgroups



Next Steps

- Roadmap Report
- RFI
- ACTS COVID-19 Guidance Collaborative
- Roadmap Status:
  - Drafts under advisement by AHRQ leadership and other public/private organizations

Thank you!

Steve.Bernstein@ahrq.hhs.gov

Digital.AHRQ.gov/ACTS

Digital.AHRQ.gov/COVID-ACTS

ACTS Consensus Future Vision and Roadmap for Achieving it

Panel S43: A Multi-Stakeholder Roadmap for Care Transformation – the AHRQ evidence-based Care Transformation Support (ACTS) Initiative

Jerome A. Osheroff, MD, FACP, FACMI
Principal, TMIT Consulting, LLC
Chair, ACTS Stakeholder Community

Disclosure

I disclose the following relevant relationship with commercial interests:

- TMIT Consulting, LLC
  - consulting to support care transformation, no conflicts of interest with subject matter discussed

Current State: Can't Get Guidance, Tools When, Where, How Needed

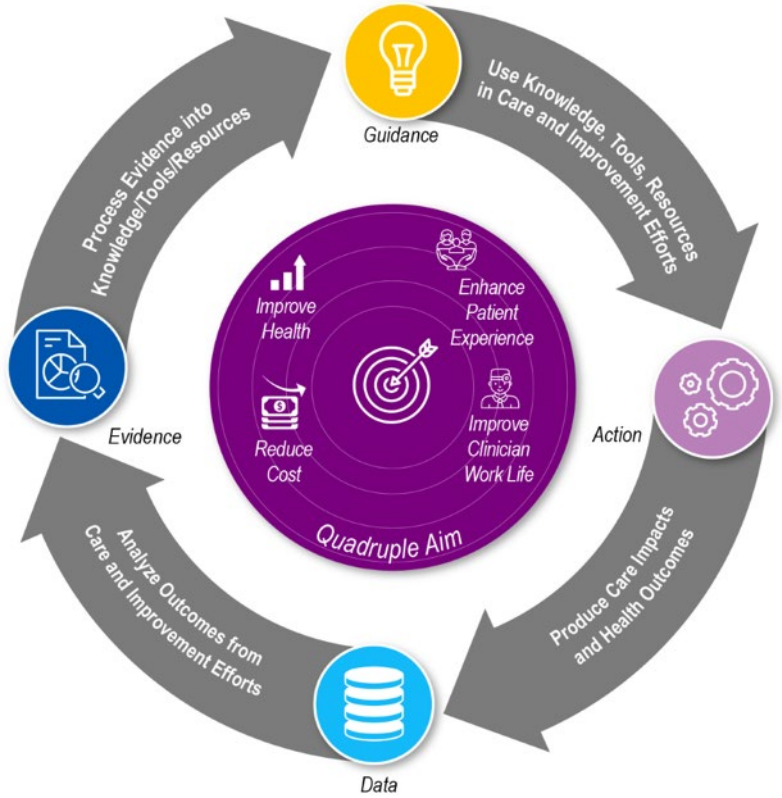
Great attention to

***Data* FAIRness;**

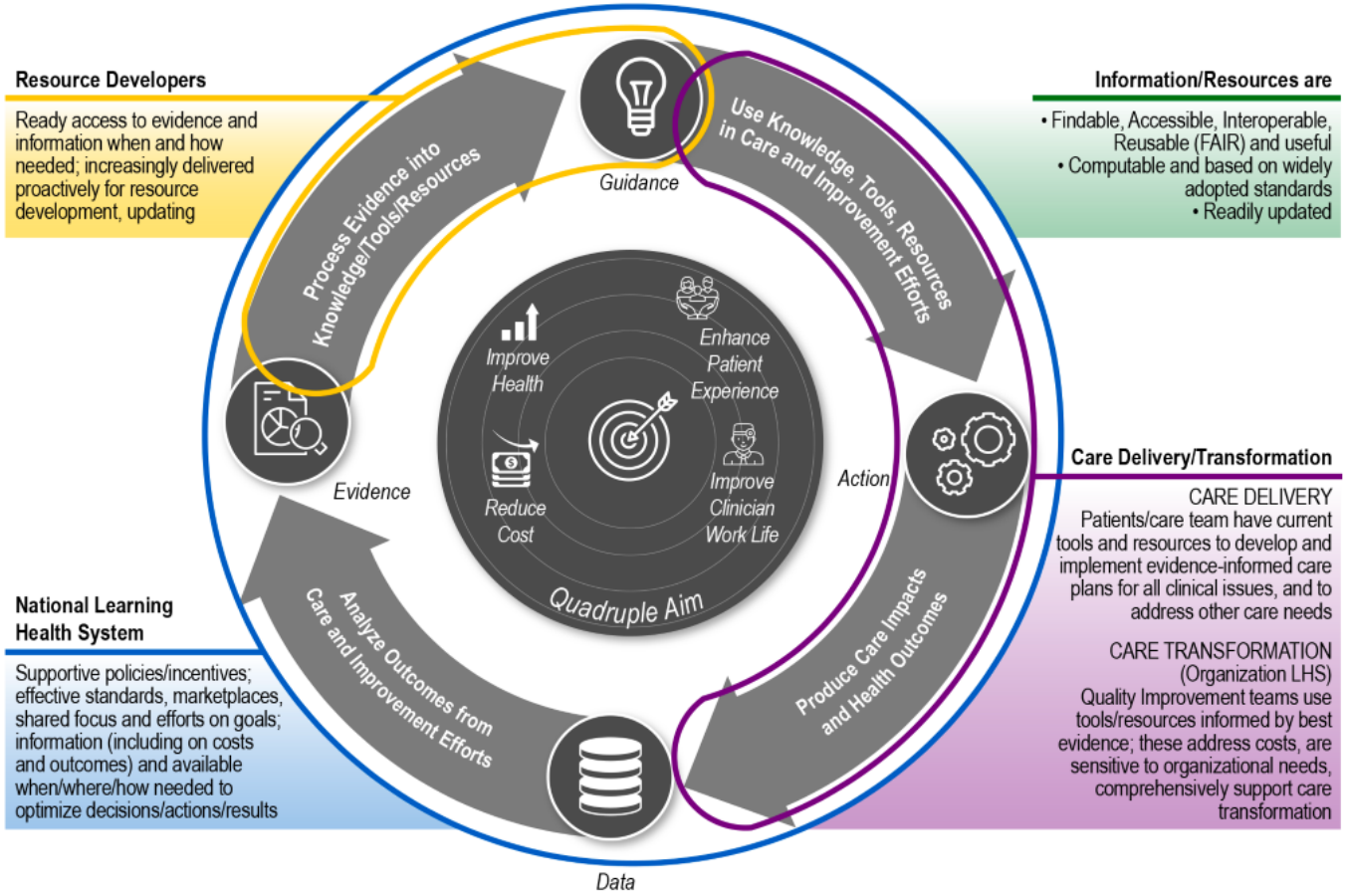
less focus on *rest of cycle*

Future Vision - Overview

- Robust stakeholder-driven **Knowledge Ecosystem** =>
- Enables a collaborative, **virtuous improvement cycle** =>
- Where stakeholder **needs are met better** throughout the cycle =>
- and Learning Health Systems **(LHSs) Achieve the Quadruple Aim**



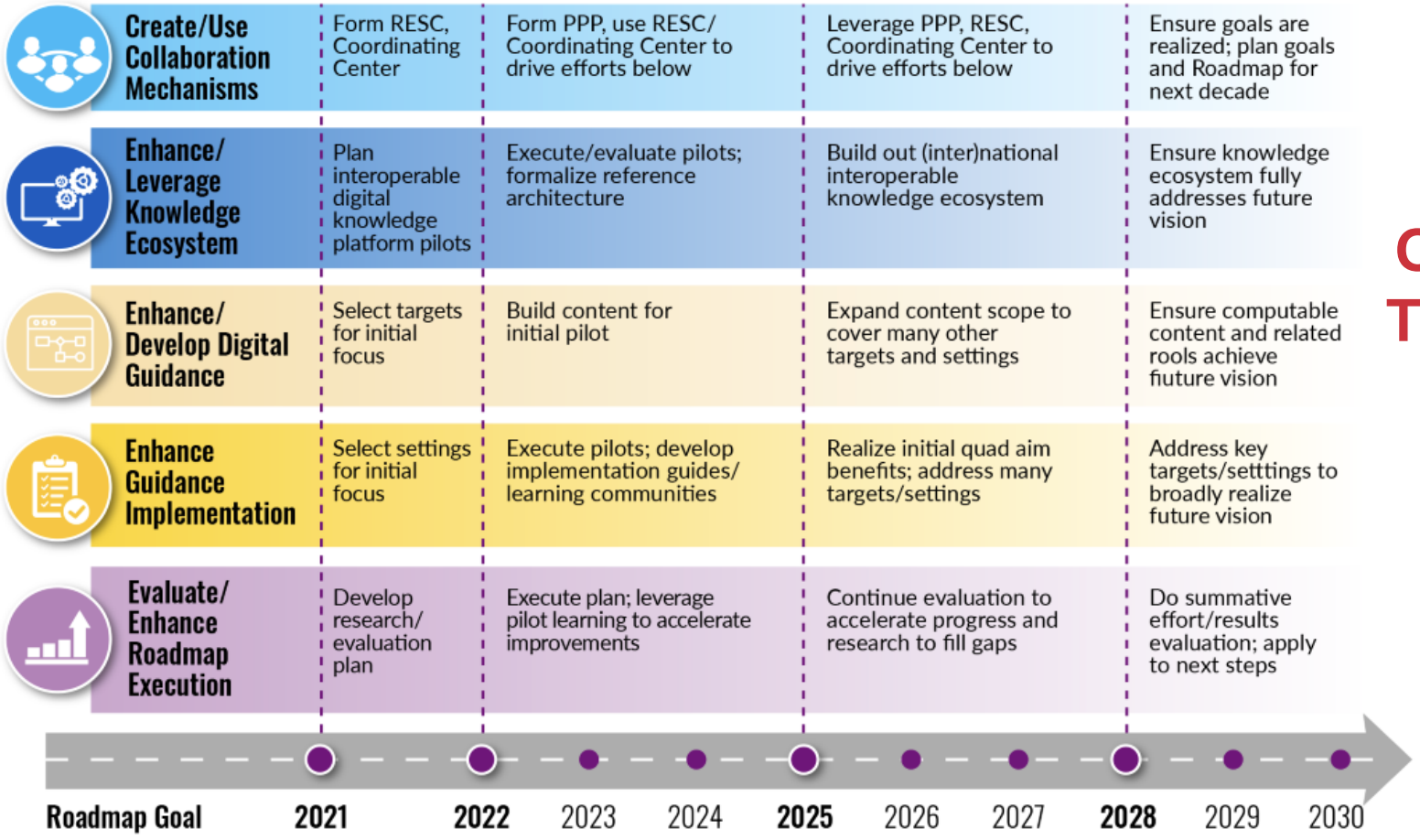
ACTS Future Vision Perspectives



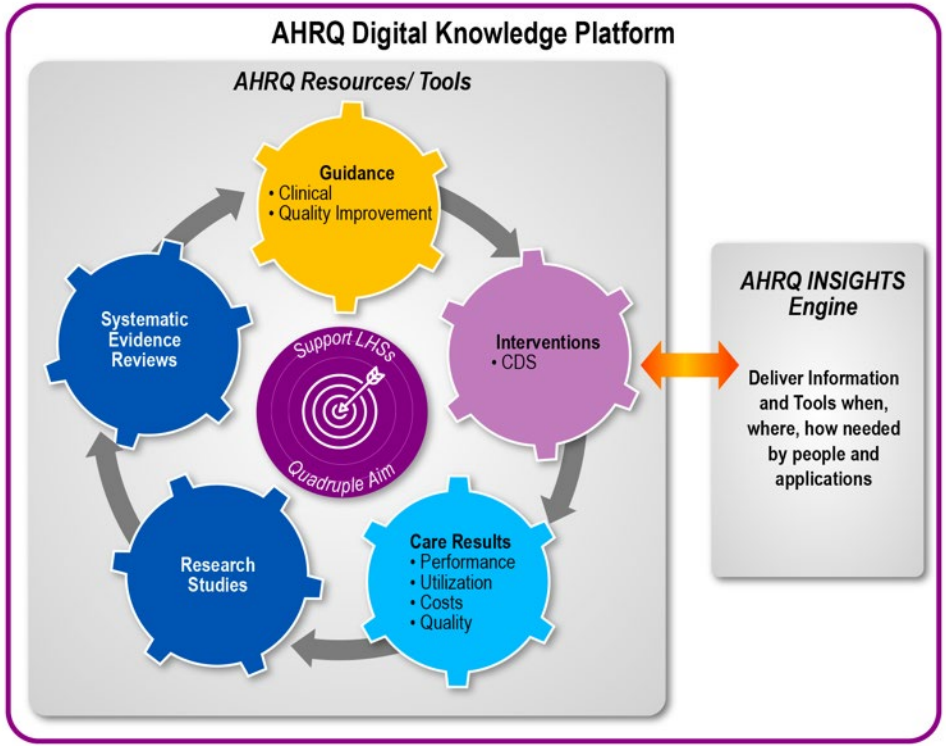
Five Goals to Achieve Future Vision

- Create/use **collaboration mechanisms** to refine/achieve shared goals
- Leverage/enhance the current **knowledge ecosystem**
- Enhance/develop **digital guidance** for care decisions and actions
- Improve **guidance implementation** speed, efficiency, effectiveness, reach
- **Evaluate**/enhance roadmap execution efforts and address research gaps

Objectives, Timeline for Roadmap Goals

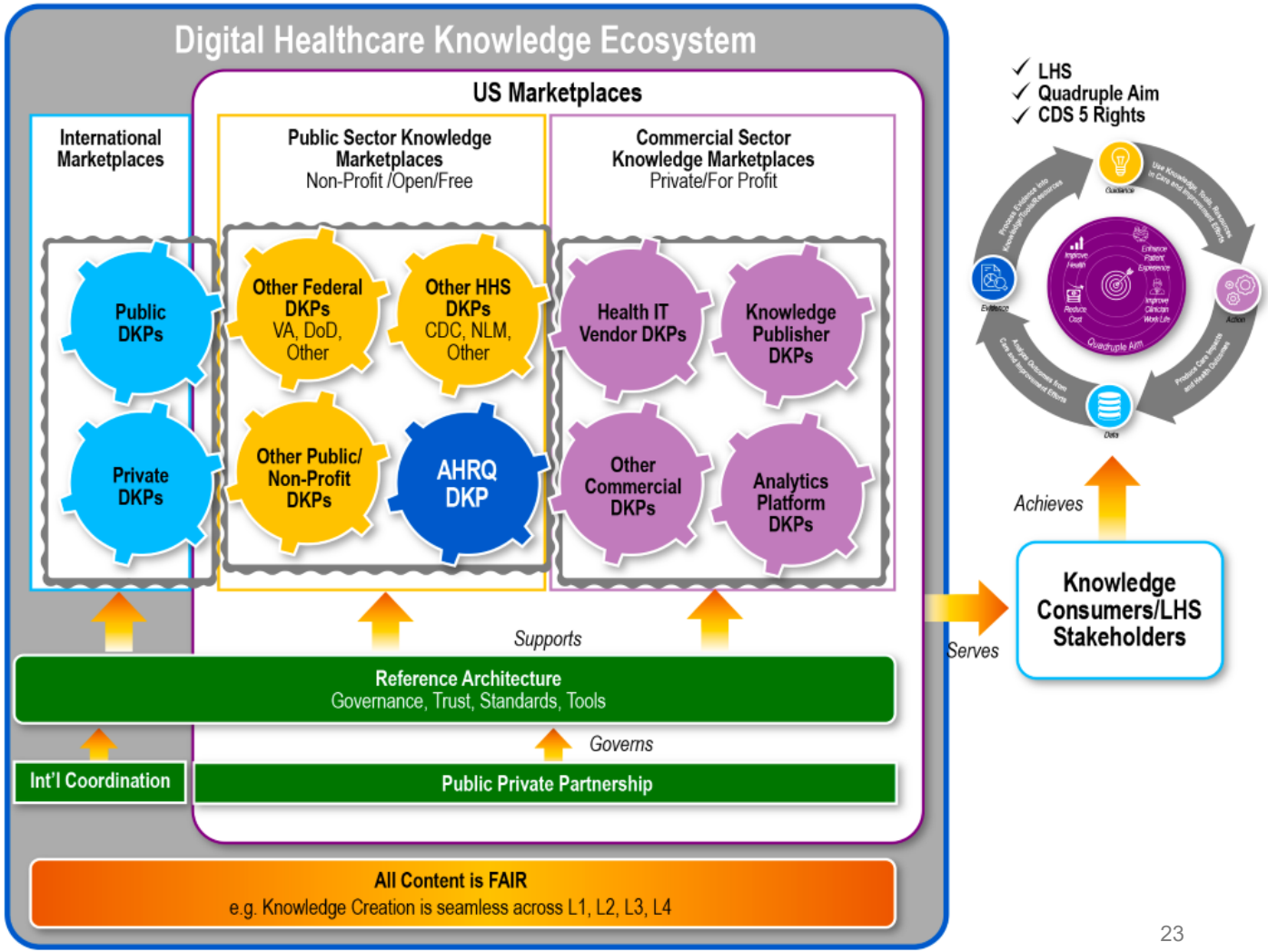


AHRQ Digital Knowledge Platform Aims



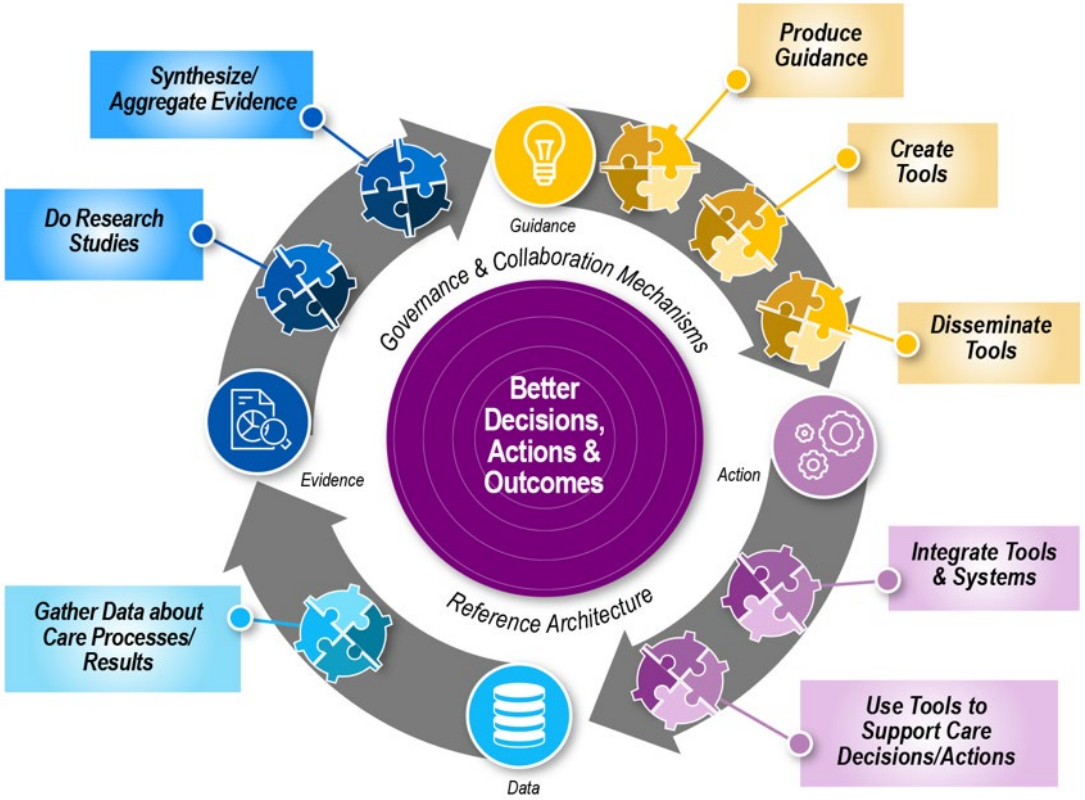
- ✓ Make AHRQ resources more FAIR, computable, useful
- ✓ Interoperate seamlessly with other knowledge sources and platforms
- ✓ Speed broad application of evidence into practice to enhance care delivery, improvement and outcomes

Knowledge Ecosystem *Structure* to Achieve ACTS Future Vision



DKP =
Digital Knowledge Platform

Future Knowledge Ecosystem *Function*



- ✓ DKPs provide information, resources and tools that are more FAIR, computable and useful, which
- ✓ Makes activities and flow *within* and *between* each cycle step more efficient and effective, to
- ✓ Create a seamless, virtuous cycle that delivers the Quadruple Aim

Preliminary Efforts to Deliver Future Vision: ACTS COVID-19 Guidance to Action Collaborative*

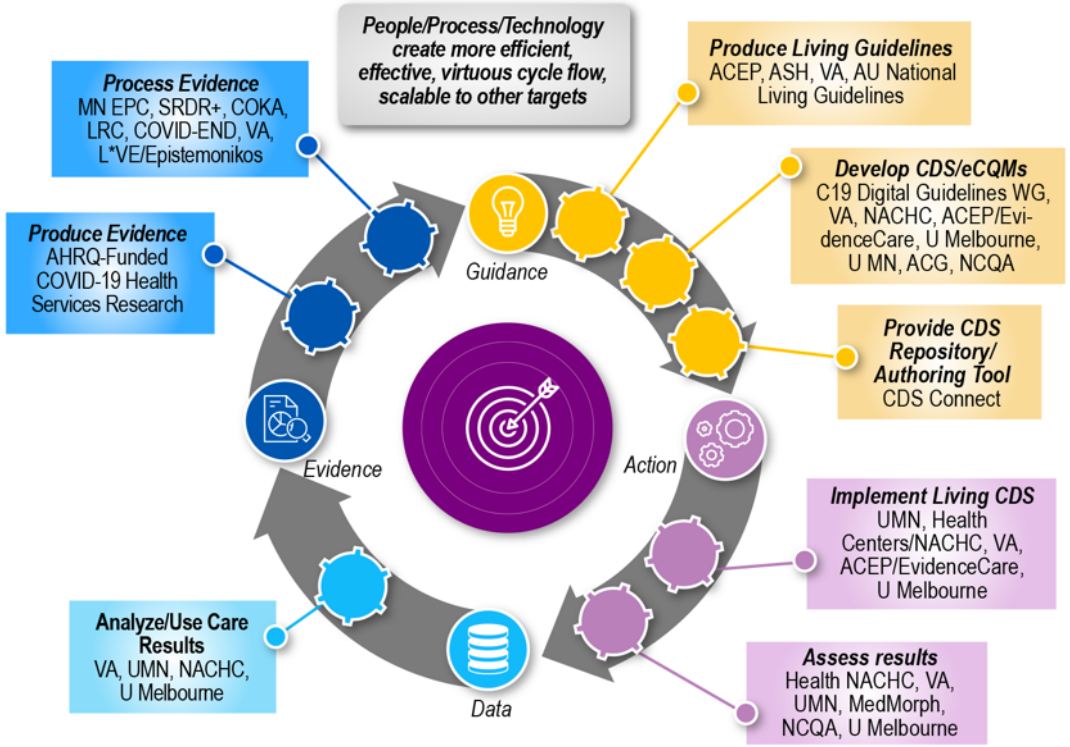
Collaborative Goals

- Cross-fertilize / accelerate efforts to develop and deliver to care teams the latest COVID-19 evidence-based guidance - and tools to apply it;
- Measurably improve care / outcomes for COVID-19 patients, care teams in limited settings for selected targets addressed by participants *in ways that can be scaled to many other targets and settings*;
- Advance tools, standards, and collaborations that seed the digital knowledge platforms (from AHRQ/others), knowledge ecosystem, reference architecture, and public private partnerships.

*see digital.ahrq.gov/covid-acts

ACTS COVID-19 Collaborative Ecosystem Enhancement

*Sampling of Where/How Organizations Are Engaged**



- ✓ Synthesizing best practice tool and strategy recommendations for optimizing steps/cycle
- ✓ Rec Sources = Collaborative participants and their networks
- ✓ Participants will use Recs to enhance their efforts, synergies with other efforts
- ✓ Generate insights to drive AHRQ DKP requirements (e.g., for EPCs, SRDR, CDS Connect, guidance (USPSTF))

*see Collaborative website for more info

ACTS and *Your* Efforts

- Your work within knowledge ecosystem is a building block for (potential) Roadmap execution
- Roadmap shared vision and execution efforts could provide context for enhancing your work's efficiency, reach and value
- Other panelists will model these synergies. They have been centrally involved in ACTS Roadmap development and COVID Collaborative
  - Represent federal agencies, health IT vendors, leads on major ecosystem initiatives
  - Have addressed mobilizing data, evidence/knowledge standards and interoperability, and making guidance computable

Thank you!

josheroff@tmitconsulting.com

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How the ACTS LHS-related Goals Align with CDC's Goals of Improving the Public's Health

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Maria Michaels

Public Health Advisor, Centers for Disease Control and Prevention

Disclosure

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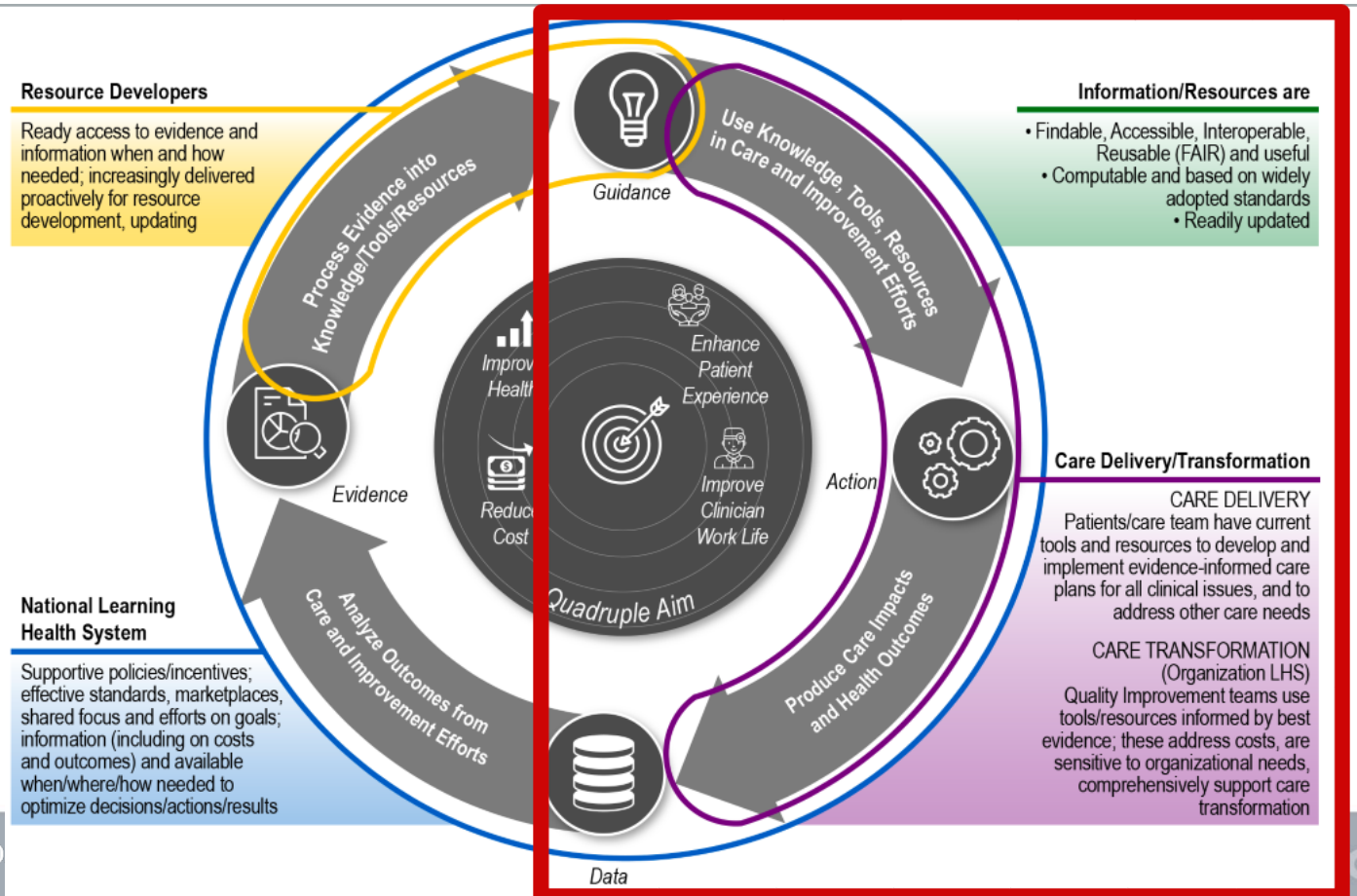
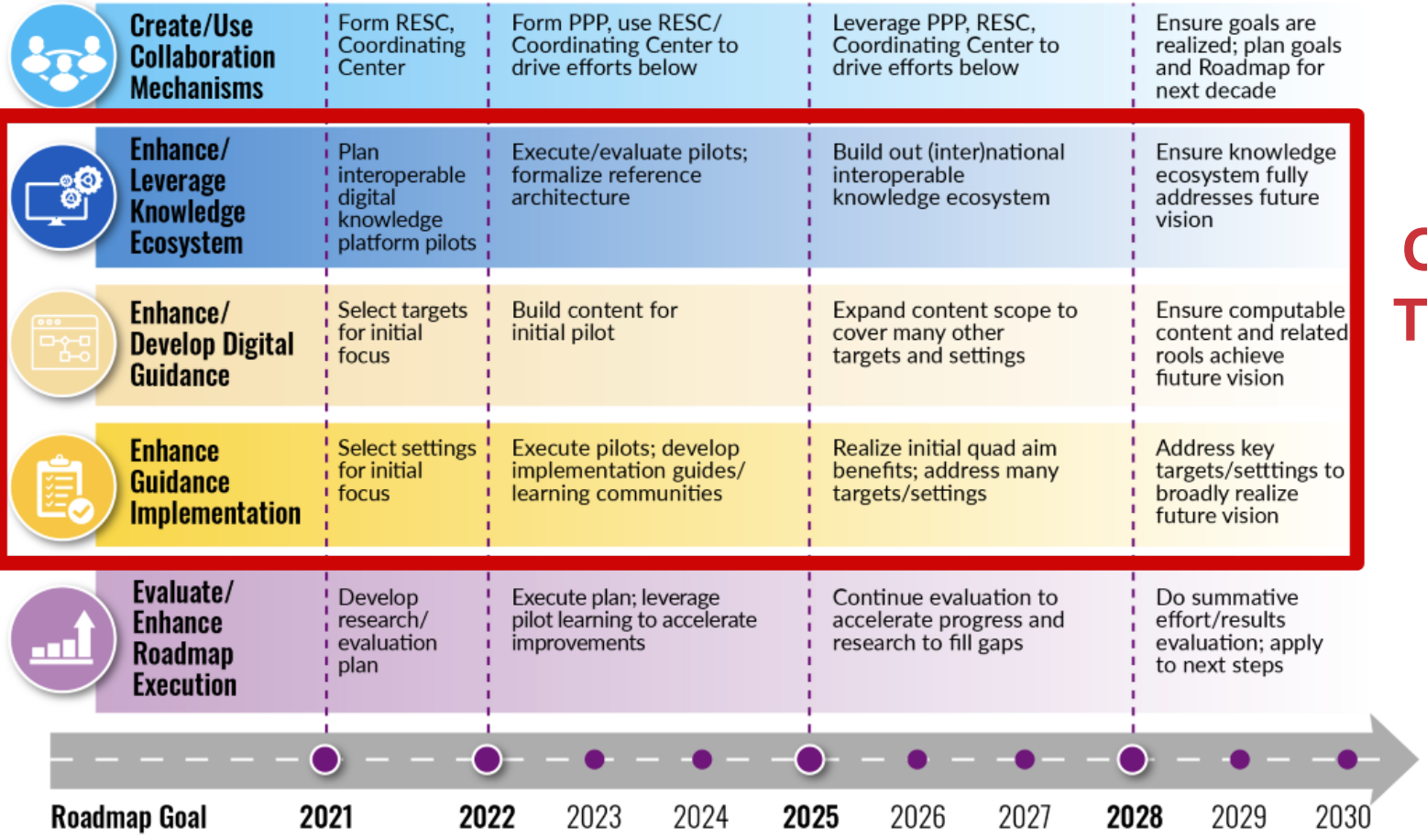
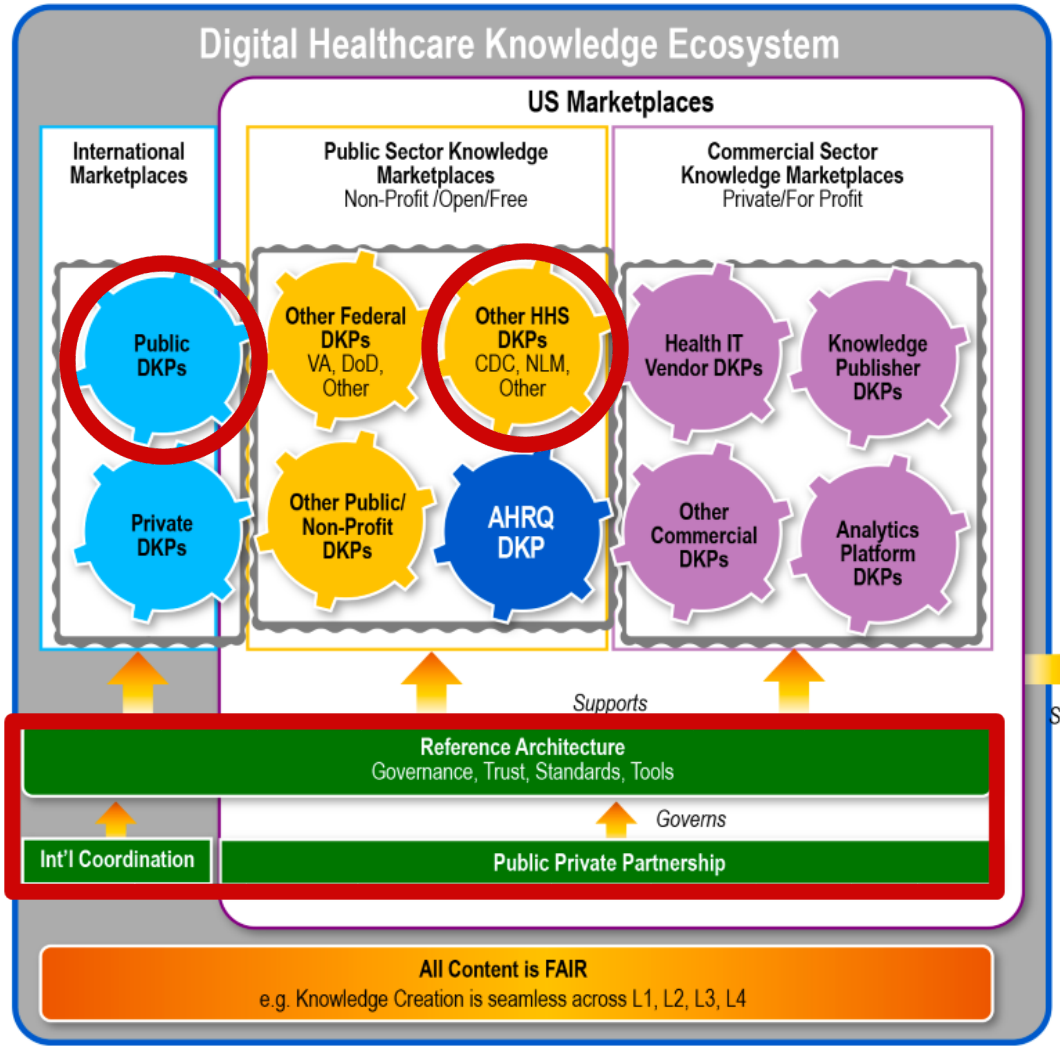


Objectives, Timeline for Roadmap Goals



Knowledge Ecosystem to Achieve ACTS Future Vision



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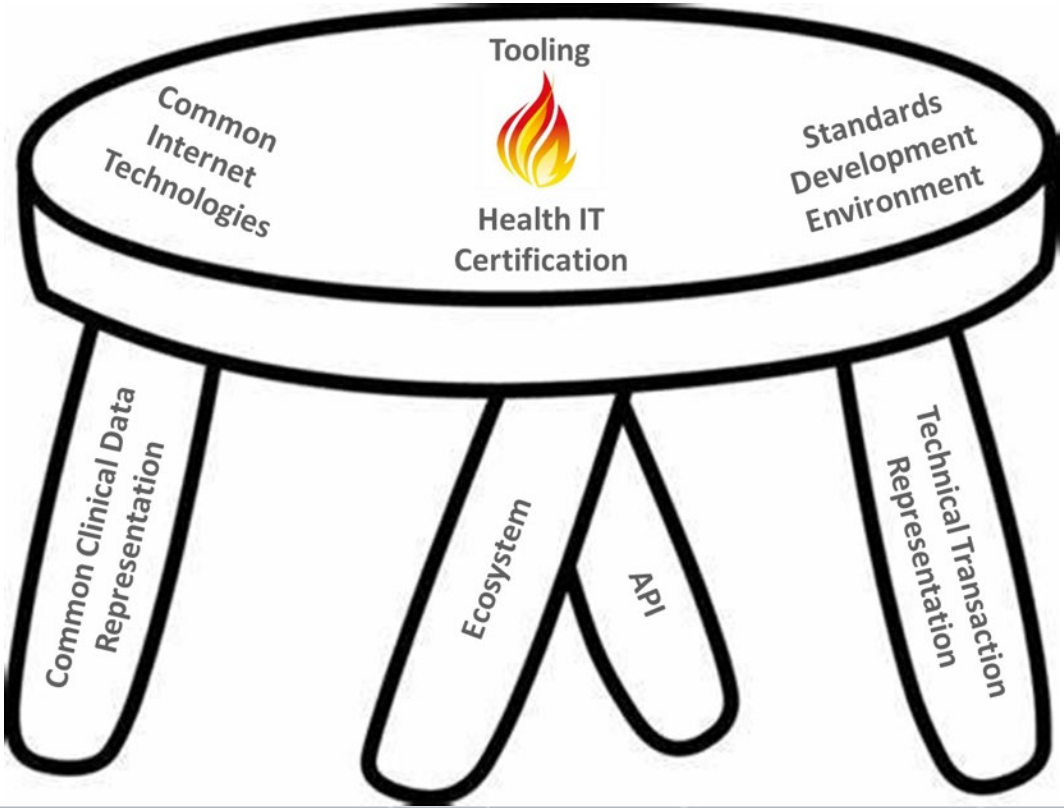
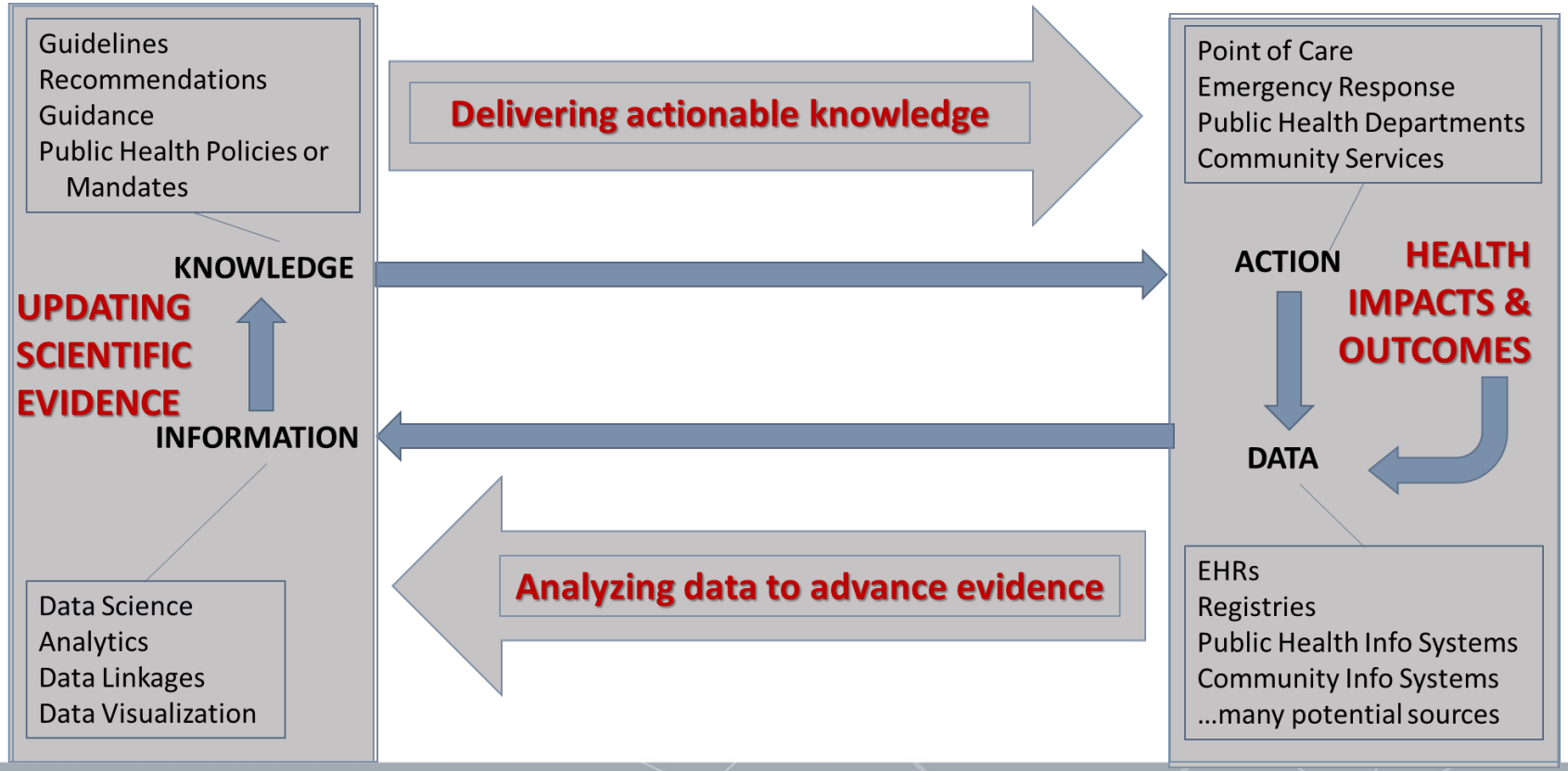
How Common Standards Help Achieve the ACTS Future Vision

FHIR Four-Legged Stool



The Data Lifecycle and the Public's Health



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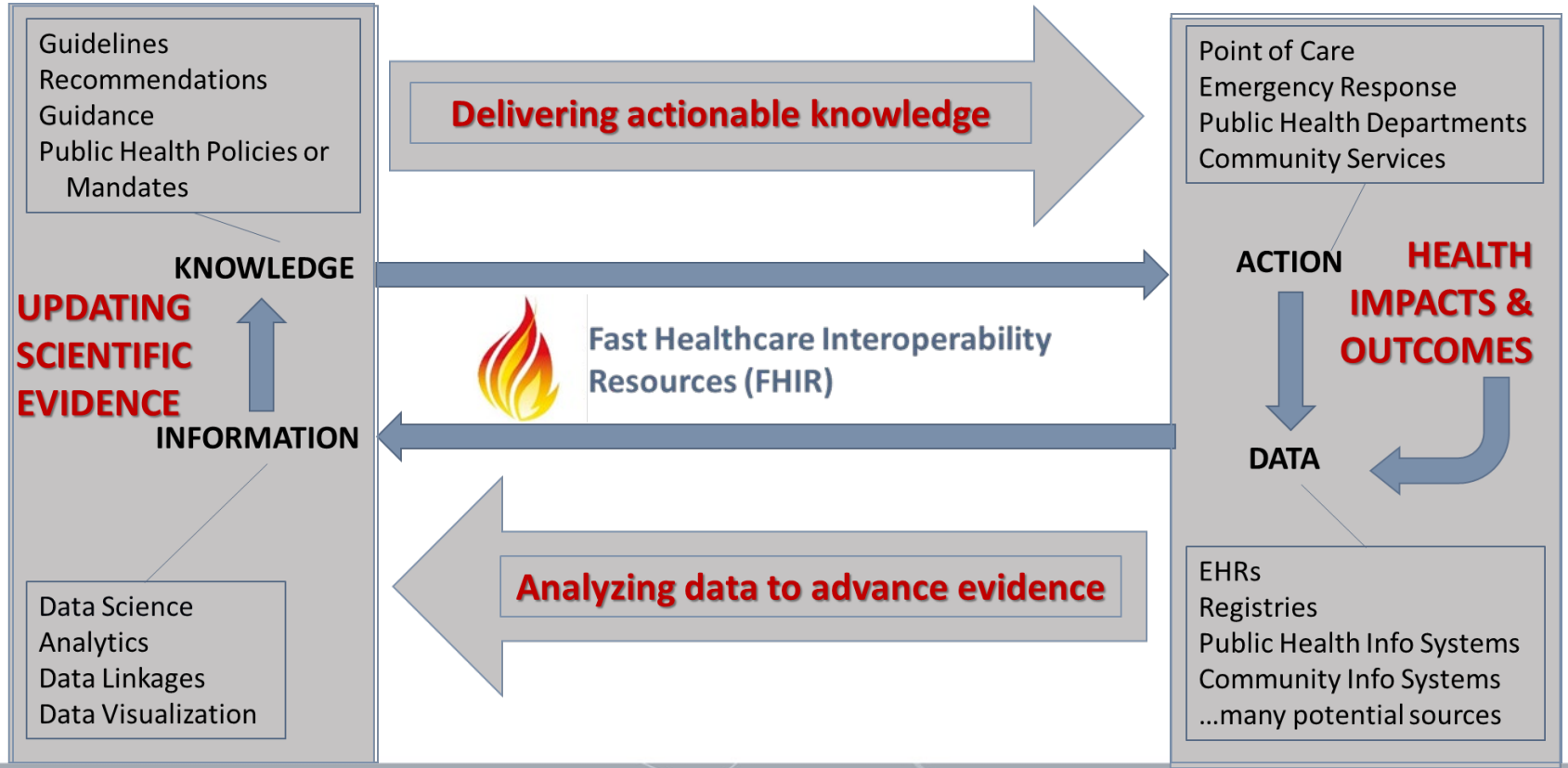
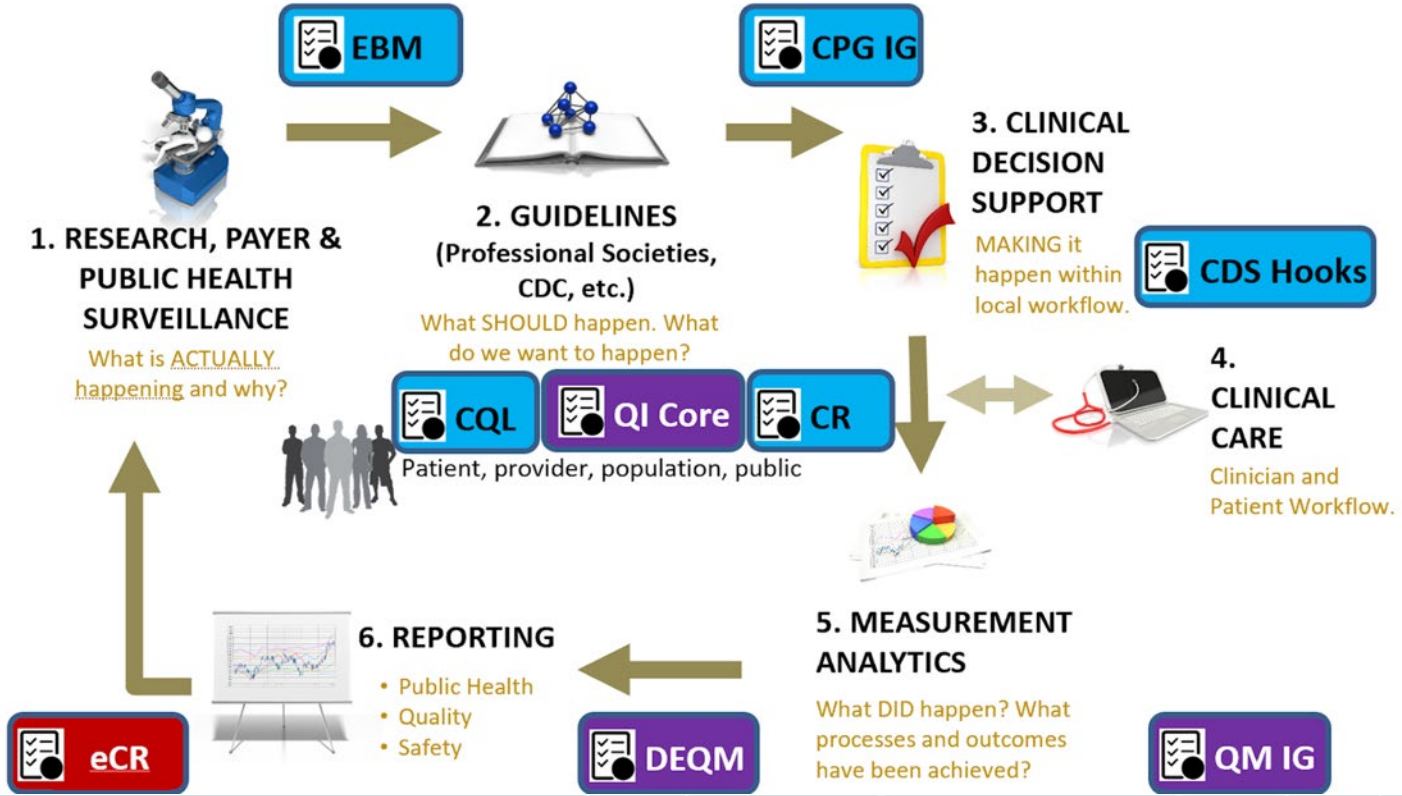


Clinical Quality Lifecycle with Situated Standards



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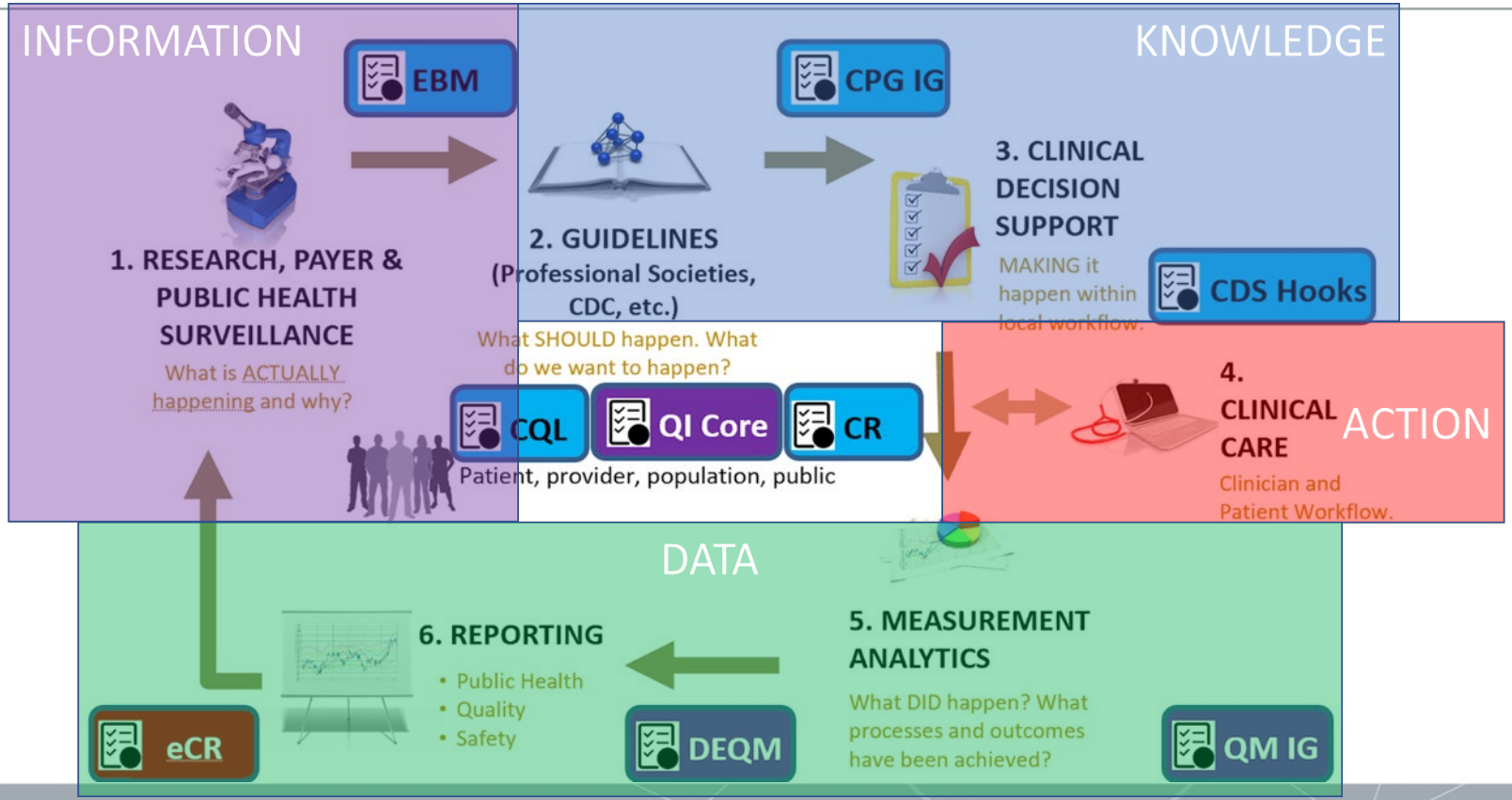
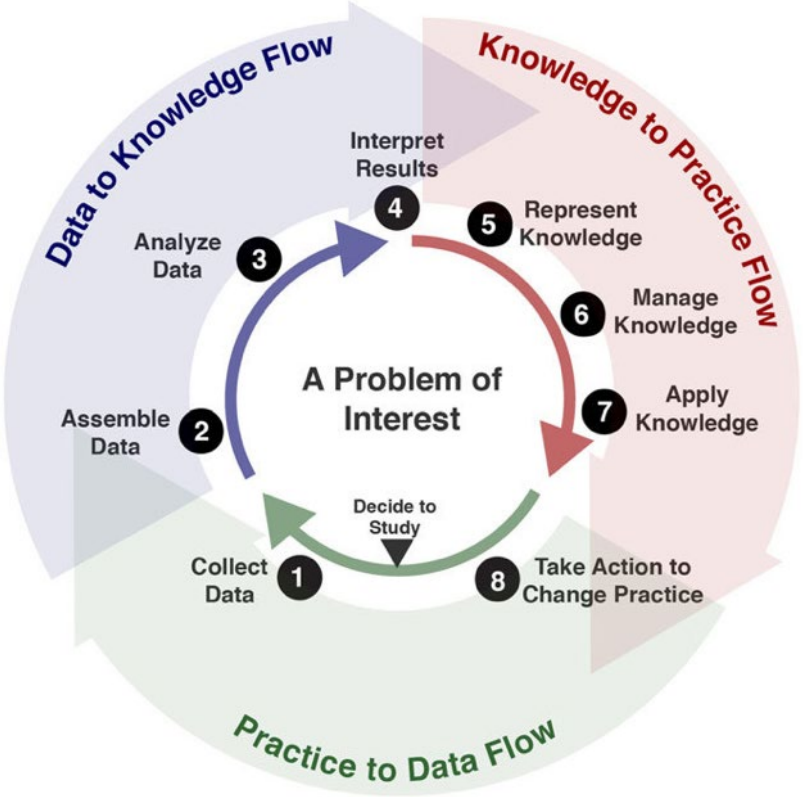


The Learning Health System



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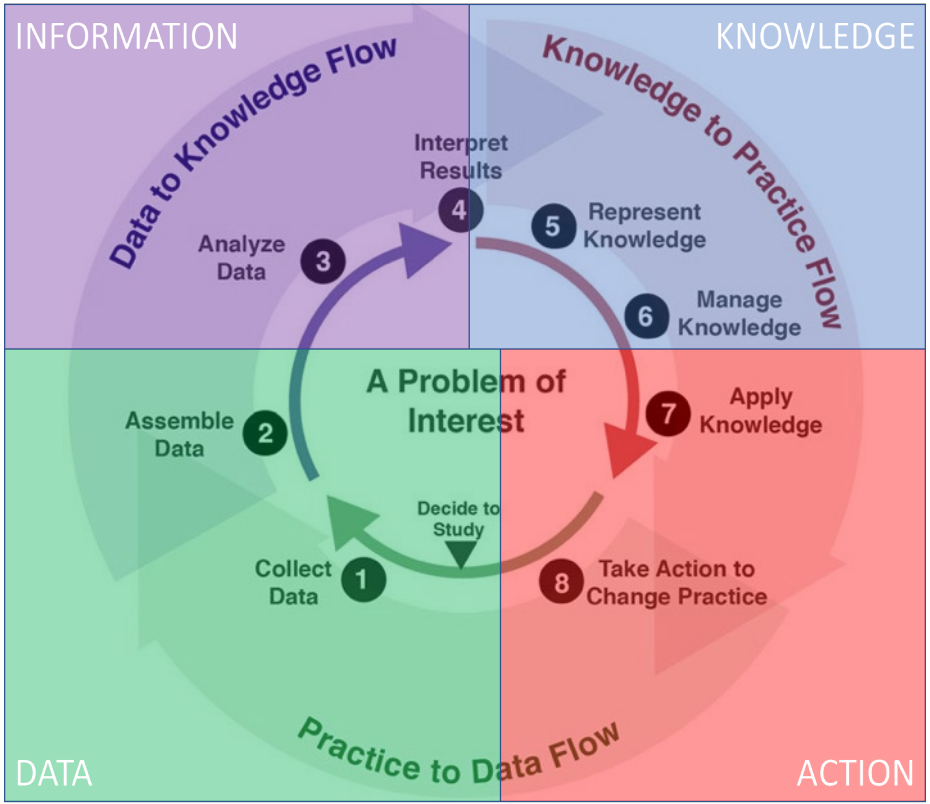
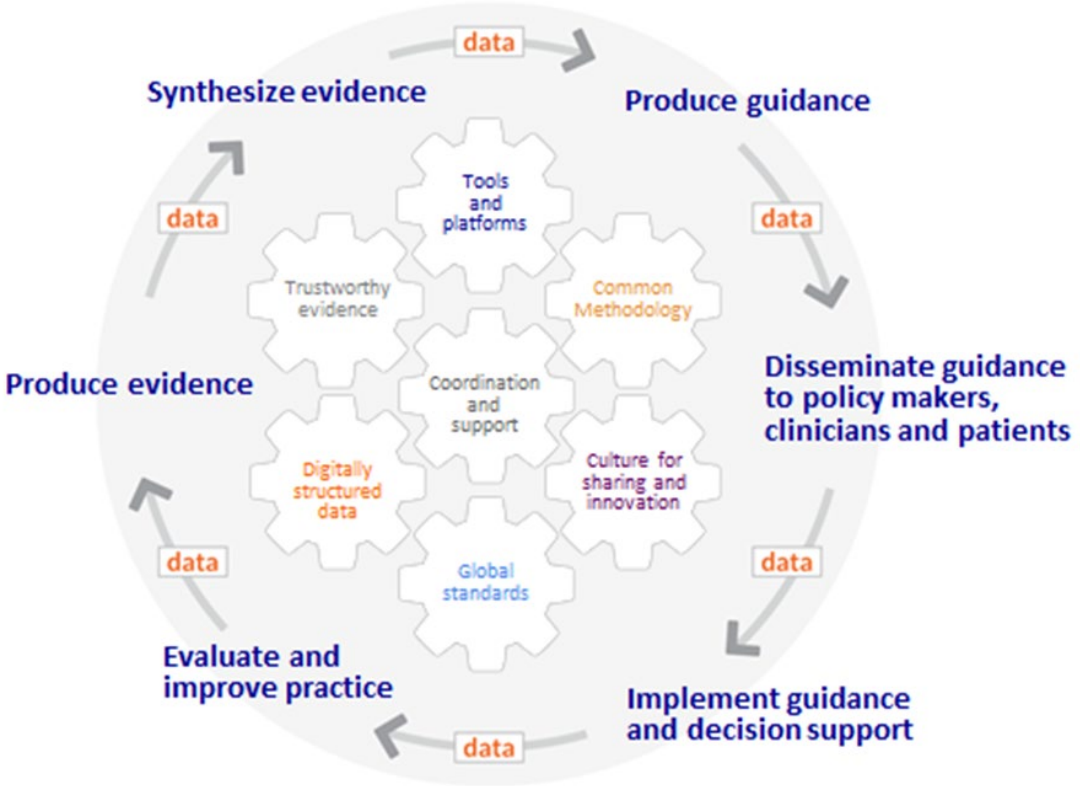


The Digital and Trustworthy Evidence Ecosystem



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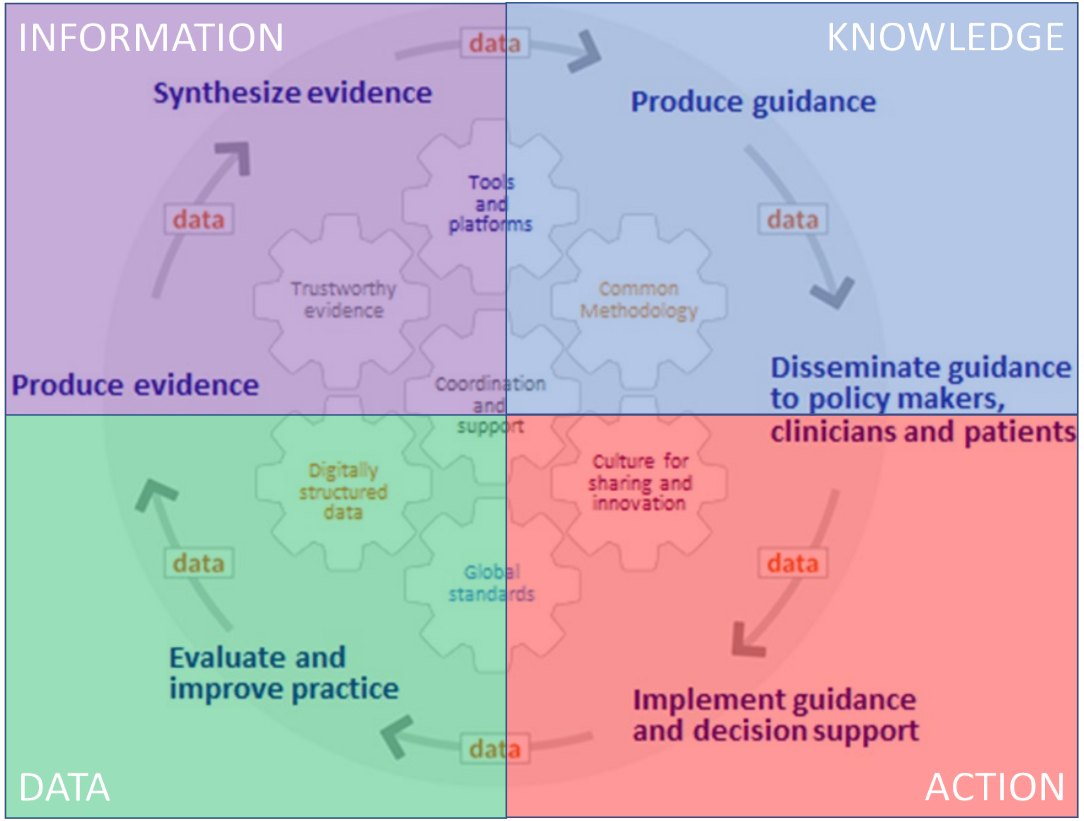

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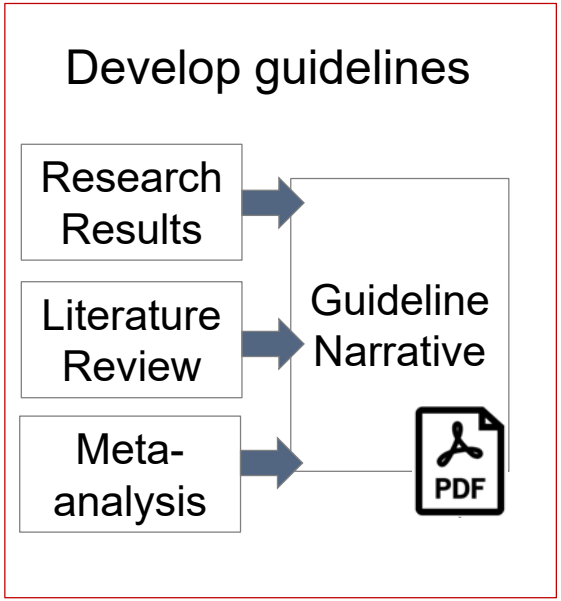
What are Computable Guidelines, and How Are They Critical to the Roadmap for Care Transformation?

Today's Guideline Development and Implementation

Long Implementation Time



Today's Guideline Development and Implementation

Long Implementation Time

Develop guidelines

Research Results

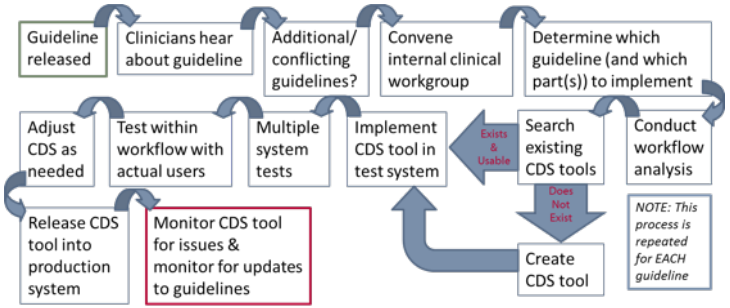
Literature Review

Meta-analysis

Guideline Narrative

PDF

Interpret guidelines



Performed by up to 96% of ~5500 hospitals

Performed by up to 86% of ~355,000 clinics

https://dashboard.healthit.gov/quickstats/quickstats.php

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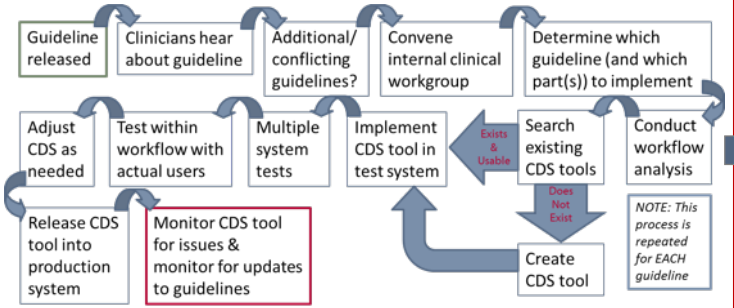

Performed by up to 96% of ~5500 hospitals

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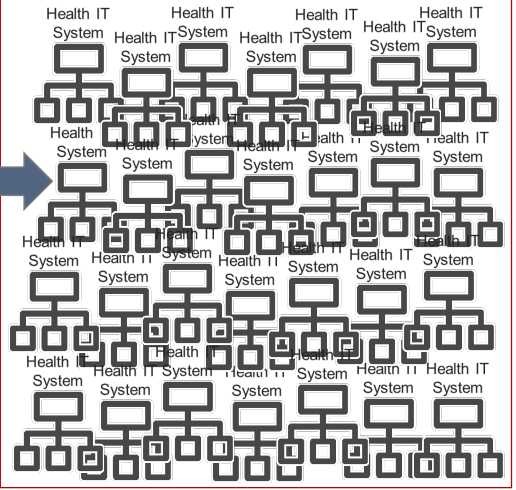
Implement guidelines



https://dashboard.healthit.gov/quickstats/quickstats.php

Adapting Clinical Guidelines for the Digital Age

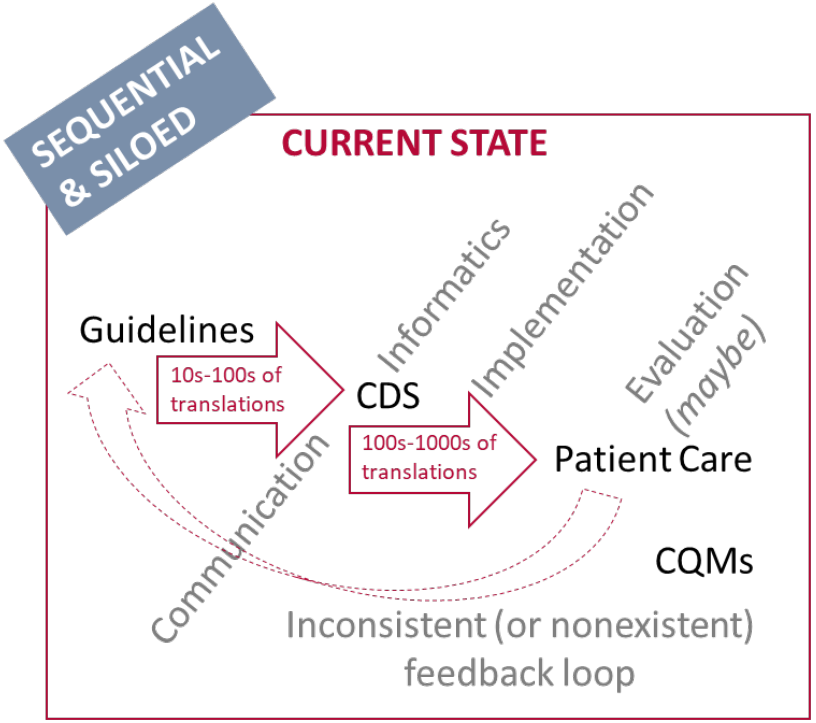
Problem: Long Lag Time, Inconsistencies, and Inaccuracies in Translation	**Reason**: Playing the "Telephone Game"	**Solution**: Developing Tools and Guidelines Together
Leads to an average of 17 years for scientific evidence to apply in patient care	Multiple translations of guidelines add complexity, opportunity for error, and variation across sites/providers	Can help evidence apply to patient care more easily, quickly, accurately, and consistently

https://www.cdc.gov/csels/phio/clinical-guidelines/index.html

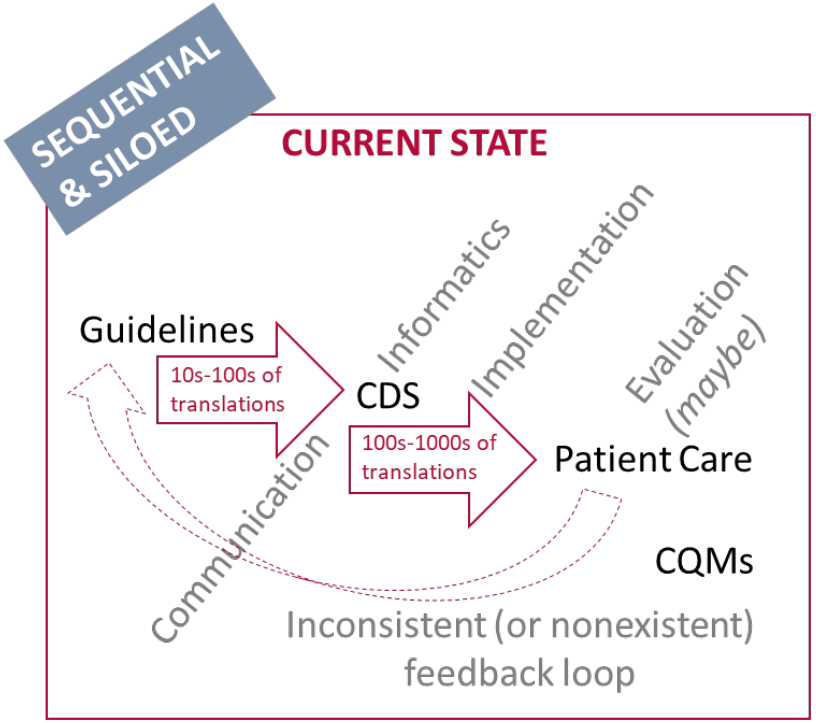
Participating Stakeholder Groups

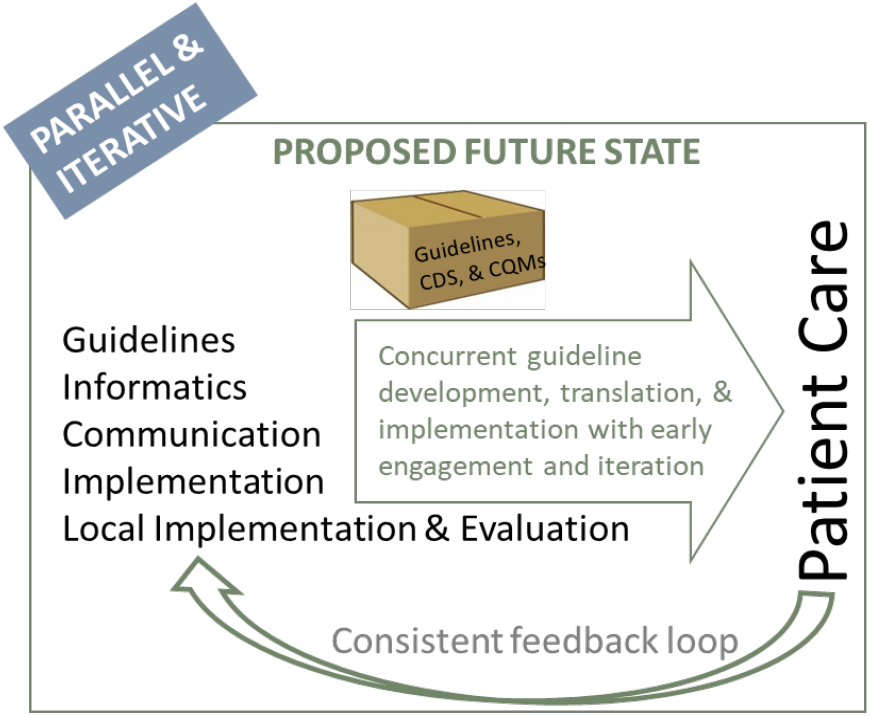
- Guideline authors
- Health IT developers
- Communicators
- Clinicians
- Patients / Patient Advocates
- Medical Societies
- Public Health Organizations
- Evaluation experts
- Laboratory Professional Groups
- Standards experts
- Clinical decision support developers
- Clinical quality measure developers
- Policy or technical support for implementation

Redesigning Guideline Development and Implementation



Redesigning Guideline Development and Implementation



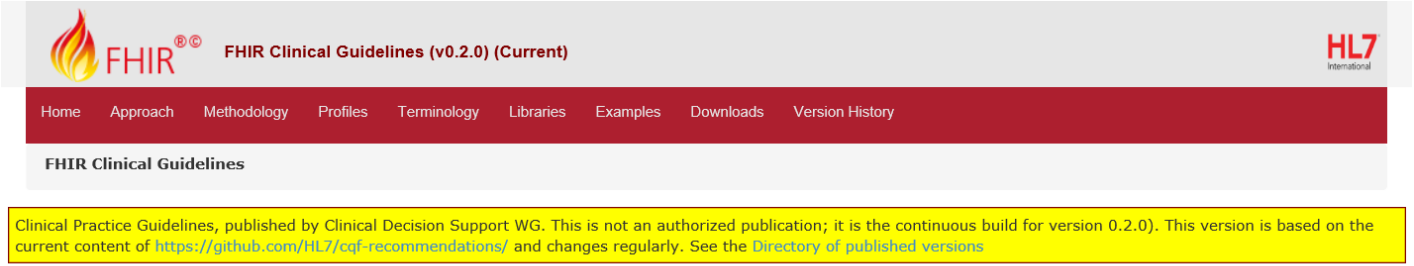


Levels of Knowledge Representation with Examples

Knowledge Level	Description	Example
L1	Narrative	Guideline for a specific disease that is written in the format of a peer-reviewed journal article
L2	Semi-structured	Flow diagram, decision tree, or other similar format that describes recommendations for implementation **(HUMAN READABLE)**
L3	Structured	Standards-compliant specification encoding logic with data model(s), terminology/code sets, value sets that is ready to be implemented **(COMPUTER/MACHINE READABLE)**
L4	Executable	CDS implemented and used in a local execution environment (e.g., CDS that is live in an electronic health record (EHR) production system) or available via web services

Adapted by Maria Michaels (CDC) from: Boxwala, AA, et al.. A multi-layered framework for disseminating knowledge for computer-based decision support. *J Am Med Inform Assoc* 2011(18) i132-i139

FHIR Clinical Guidelines (CPG-on-FHIR)



http://build.fhir.org/ig/HL7/cqf-recommendations/index.html

What is CPG-on-FHIR?

INTERNATIONAL standard (HL7, Universal Realm), including a standardized and scalable approach, to help translate and implement clinical practice guidelines and other types of guidance more efficiently and effectively

Framework for improving the knowledge ecosystem using Fast Healthcare Interoperability Resources (FHIR®©) and related common health IT standards

Key aspects include:

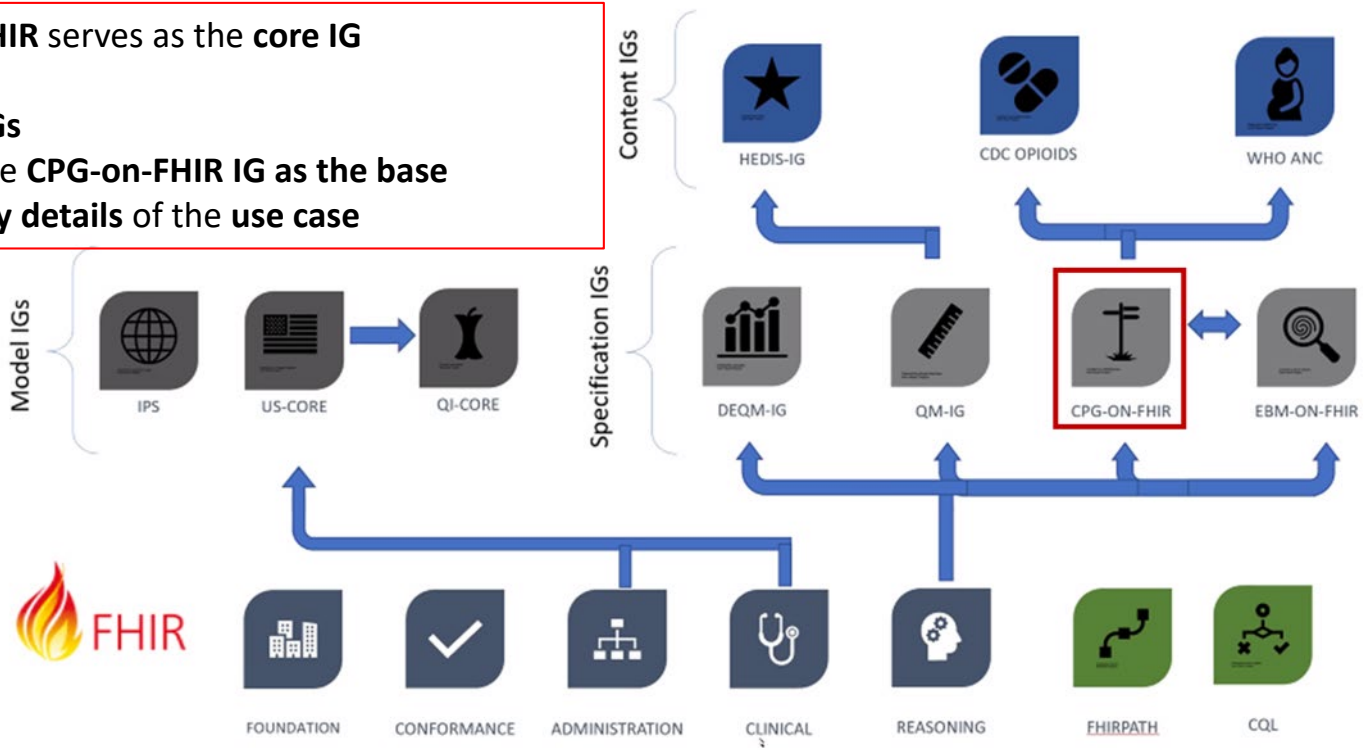
- Integrated Process
  - An integrated guideline/guidance development and implementation process
- Common standards
  - Across the entire data lifecycle (a.k.a. learning health system) and different electronic health record (EHR) platforms
- Closed-loop guideline content and information flow
  - Inclusive of feedback and feedforward processes

Framework Implementation Guide (IG)

CPG-on-FHIR serves as the **core IG**

Content IGs

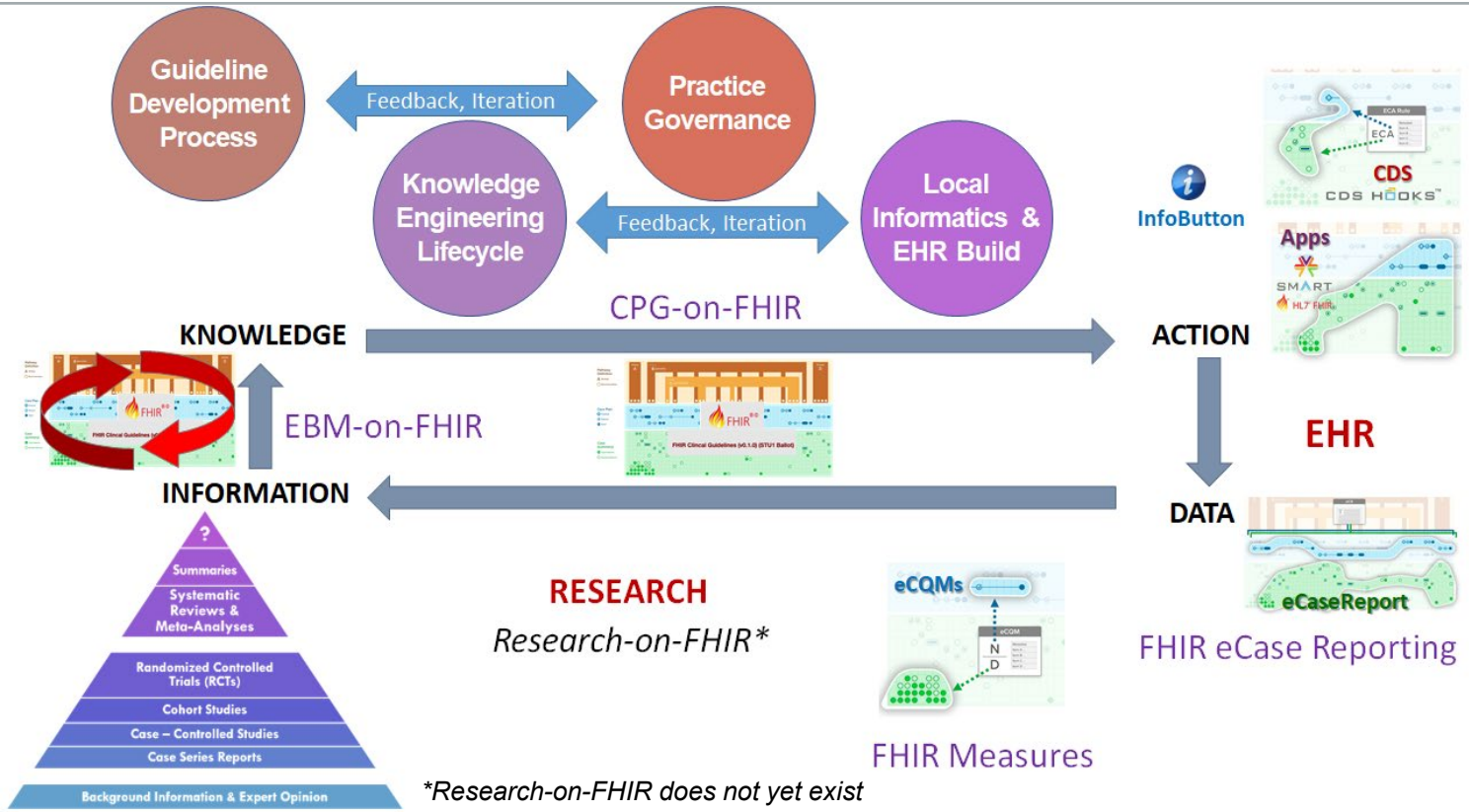
- Use the **CPG-on-FHIR IG as the base**
- **Specify details** of the **use case**



Draft IG: http://build.fhir.org/ig/HL7/cqf-recommendations/index.html

Courtesy of Bryn Rhodes, Database Consulting Group

Data Lifecycle Revisited in context of CPG-on-FHIR



INFORMATICS PROFESSIONALS. LEADING THE WAY.

How is Making EHR Data More Available for Research and Public Health Critical to the Roadmap for Care Transformation?

Making EHR Data More Available for Research and Public Health (MedMorph)

- Funded by the **Patient-Centered Outcomes Research Trust Fund (PCORTF)** via the U.S. Department of Health and Human Services (HHS) Assistant Secretary for Planning and Evaluation (ASPE)

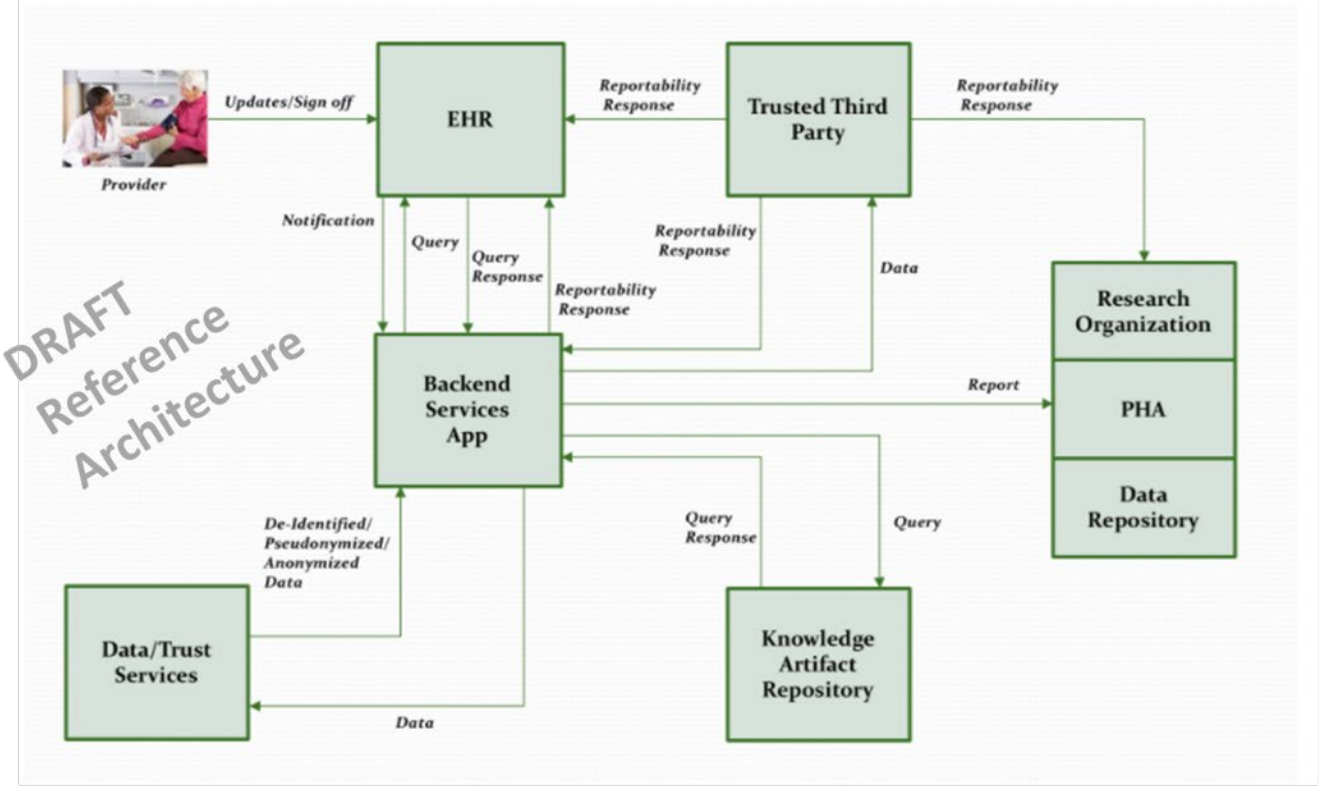
  Total project timeline: 3 years

- **PROBLEM:** Patient-centered outcomes researchers and public health professionals need better ways to get data from different electronic health record (EHR) systems without posing additional burden on health care providers
- **GOAL:** Create a reliable, scalable, generalizable, configurable, interoperable method to get EHR data for multiple public health and research use cases
- **OBJECTIVE:** Develop a reference architecture and demonstrate a reference implementation (including implementation guides)

Technical Expert Panel (TEP) Participating Stakeholder Groups

- Federal Partners
- Health IT developers
- Clinicians/ Healthcare Organizations
- Medical Societies
- Public Health Organizations
- Evaluation experts
- Laboratory Professional Groups
- Clinical and Public Health data registries
- Standards experts
- Clinical decision support developers
- Clinical quality measure developers
- Policy or technical support for implementation

MedMorph Abstract Model Actors and Systems



The abstract model actors and systems will be used to define the various workflows identified in the use cases. The workflows identified in the use cases include

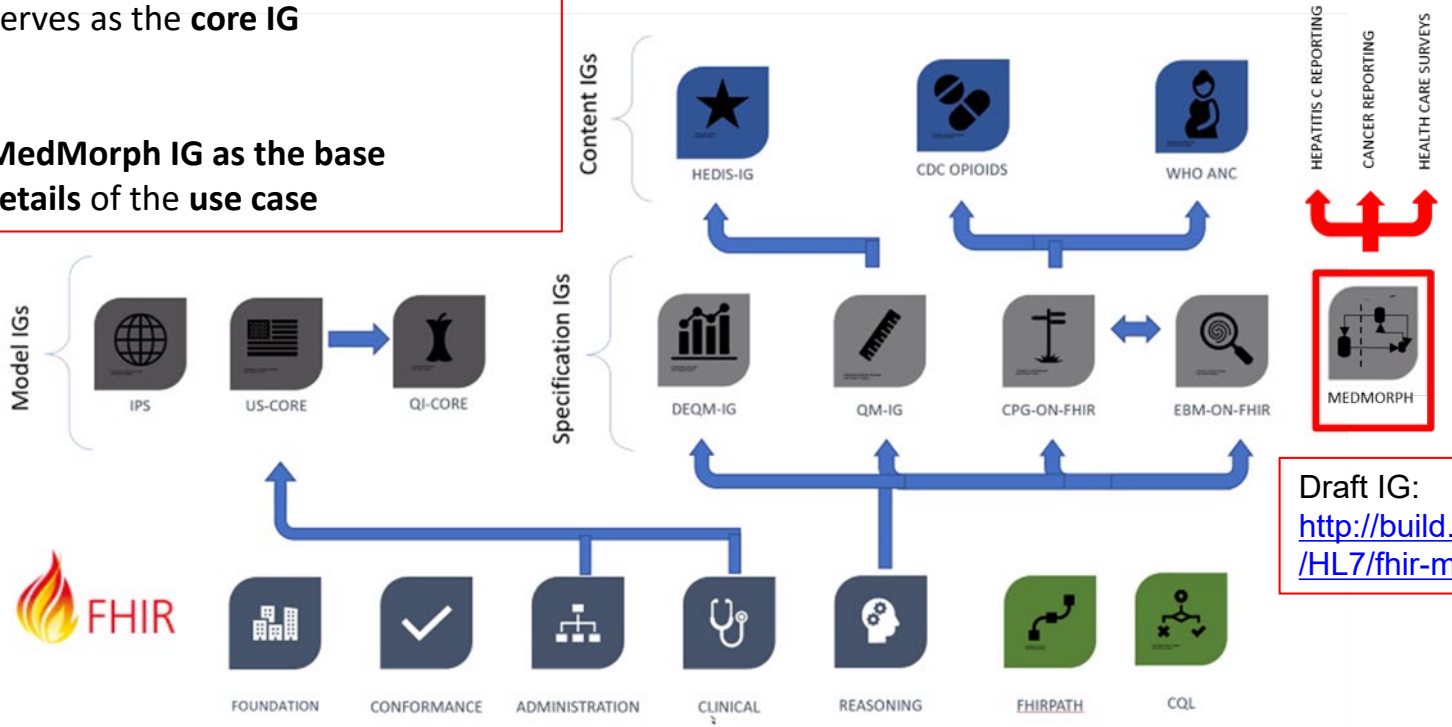
- **Provisioning**
- **Notification**
- **Data Collection and Submission Report Creation**
- **Data Submission**
- **Receiving Response/ Acknowledgement**

Framework Implementation Guide (IG)

MedMorph serves as the **core IG**

Content IGs

- Use the **MedMorph IG as the base**
- **Specify details** of the **use case**



Draft IG:
http://build.fhir.org/ig/HL7/fhir-medmorph

Courtesy of Bryn Rhodes, Database Consulting Group

Transforming the health data landscape with FHIR

Current: Multiple Different Methods/Approaches

Future: Common Method/Approach

Thank you!

maria.michaels@cdc.gov

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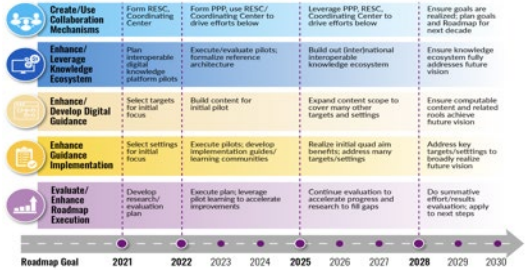


Using Standards to Realize the ACTS Vision

Panel S43: A Multi-Stakeholder Roadmap for Care Transformation – the AHRQ evidence-based Care Transformation Support (ACTS) Initiative

Brian S. Alper, MD, MSPH, FAAFP, FAMIA

Chief Executive Officer, Computable Publishing, LLC

Project Lead, EBMonFHIR; Project Lead, COVID-19 Knowledge Accelerator (COKA)

balper@computablepublishing.com

@brianalperMD

#AMIA2020

Disclosure

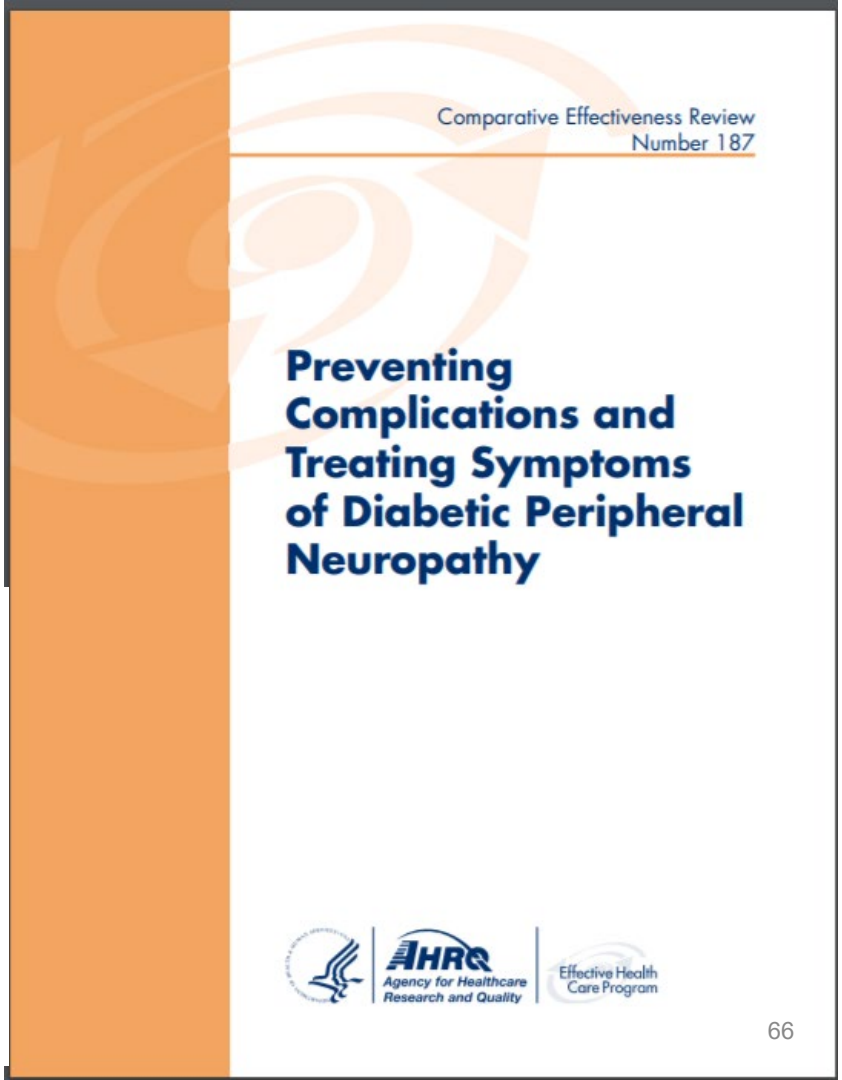
I disclose the following relevant relationship with commercial interests:

- Computable Publishing, LLC – current commercial interest
  - Augments digital publishing with machine-interpretable forms
  - Offers publishers the ability to extend their published works with computable (machine-interpretable) forms of expression
  - Offers users of any type support in using computable data to enhance, improve and achieve desired outcomes
- DynaMed – Founder, no current commercial interest

How does AHRQ evidence reach CDS in digital forms today?

58 / 384

		than placebo for reducing pain.	
Topical capsaicin			
Topical capsaicin 0.075% vs placebo	**5 studies** Previous SR: 3 RCTs Additional identified studies: 2 RCTs (N=432)	The previous review concluded that capsaicin 0.075% was more effective than placebo for reducing pain (Standardized mean difference -0.91 [CrI, -1.18 to -0.08]). The pooled Standardized mean difference from a meta-analysis of 3 studies (2 from previous review and 1 new study) where a Standardized mean difference could be calculated was -0.46; 95% CI, -0.95 to 0.03) Capsaicin is not more effective than placebo for reducing pain.	Low
Topical	1 study:	We could not draw conclusions	Insufficient



Diabetic Peripheral Neuropathy

› Opioids
Other medication options
Topical medications
Aldose reductase inhibitors
› Dietary supplements
Chinese herbal medicines
Metoclopramide for gastroparesis
Other medications
Comparative efficacy
Surgery and procedures
Consultation and referral
› Other management
› Complications and Prognosis
› Prevention and Screening

- capsaicin 0.075% cream might not be useful for patients with diabetic peripheral neuropathy

STUDY SUMMARY

capsaicin 0.075% cream might not reduce pain in patients with diabetic peripheral neuropathy DynaMed Level 2

SYSTEMATIC REVIEW: AHRQ Comparative Effectiveness Review 2017 Mar:187 | PDF

Details

STUDY SUMMARY

capsaicin low-dose cream (0.075%) for ≥ 6 weeks might reduce chronic neuropathic pain but is poorly tolerated

COCHRANE REVIEW: Cochrane Database Syst Rev 2012 Sep 12;(9):CD010111

Details

- topical lidocaine
  - consider lidocaine patch for treatment of painful diabetic neuropathy (AAN Level C) [3]
  - lidocaine 5% patches, 1-3 patches applied topically once daily and left on for up to 12 hours/day can be added to other treatments at any time [3]

The Healthcare Knowledge Ecosystem Today

The Healthcare Knowledge Ecosystem Desired

EVIDENCE

Data Analysis, Synthesis, and Interpretation.

DATA

Observations and Measurements.

GUIDANCE

Guidelines, Recommendations, Decision Aids, Decision Support

ACTION

Healthcare (testing and intervention) decision-making and implementation

Applying Standards to a Domain

Specific content and people

Contextualized application for each instance

Schema

Common format for how data elements are expressed

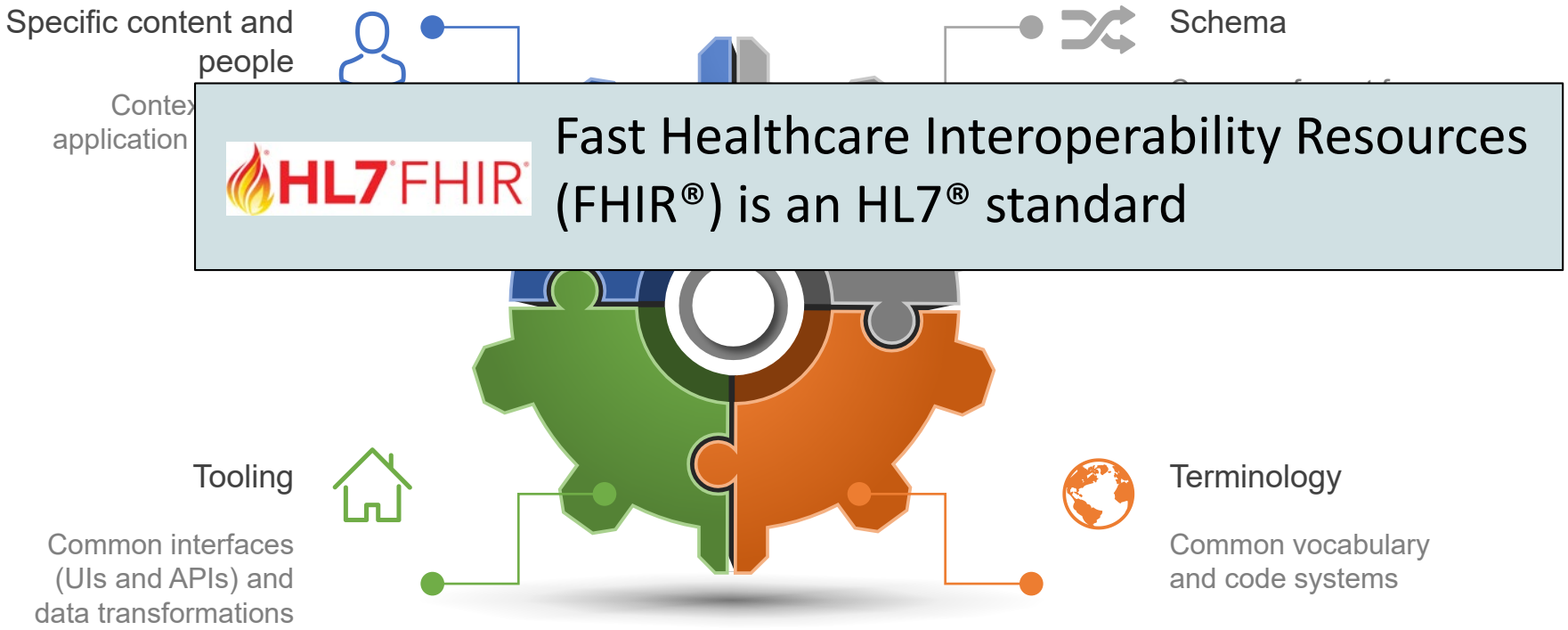
Tooling

Common interfaces (UIs and APIs) and data transformations

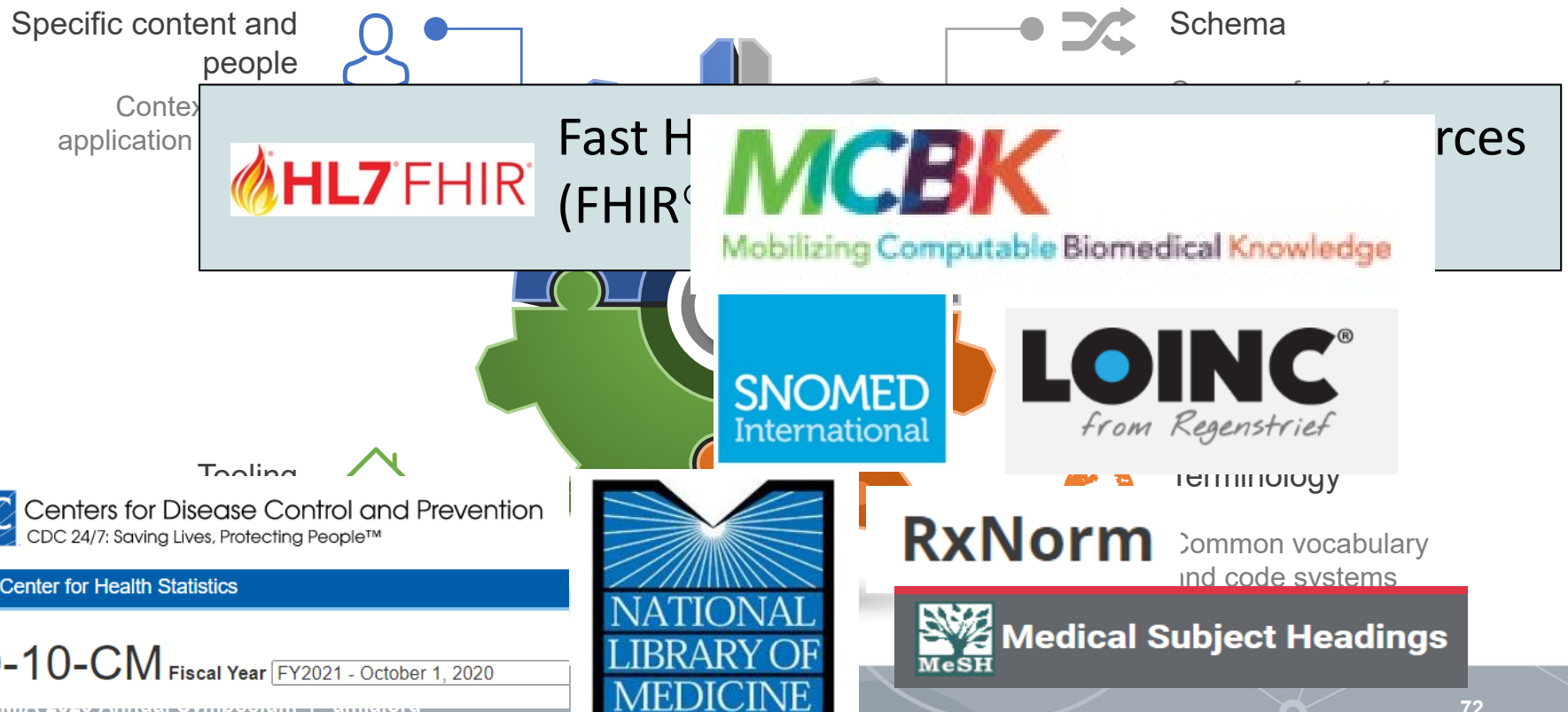
Terminology

Common vocabulary and code systems

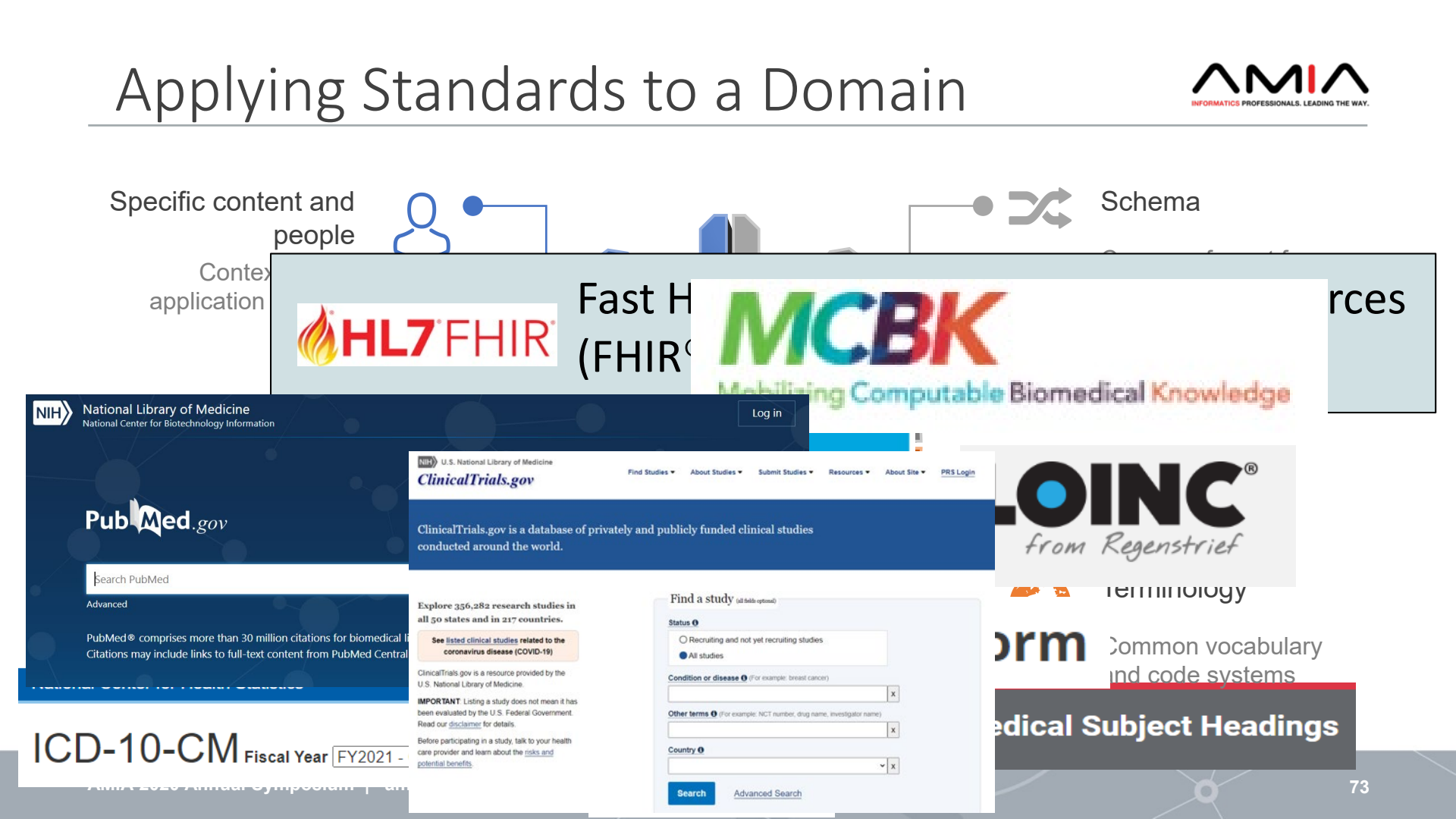
Applying Standards to a Domain



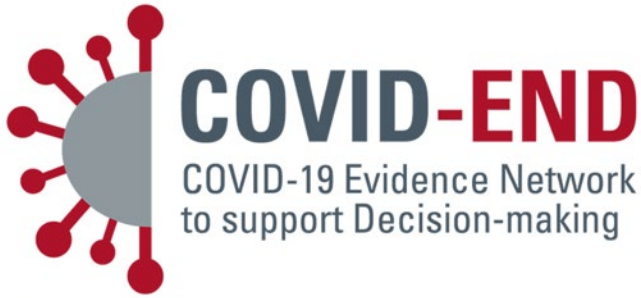
Applying Standards to a Domain



Applying Standards to a Domain



Applying Standards to a Domain



Schema

Fast H
(FHIR
rces

MCBK
Mobilizing Computable Biomedical Knowledge

LOINC®
from Regenstrief

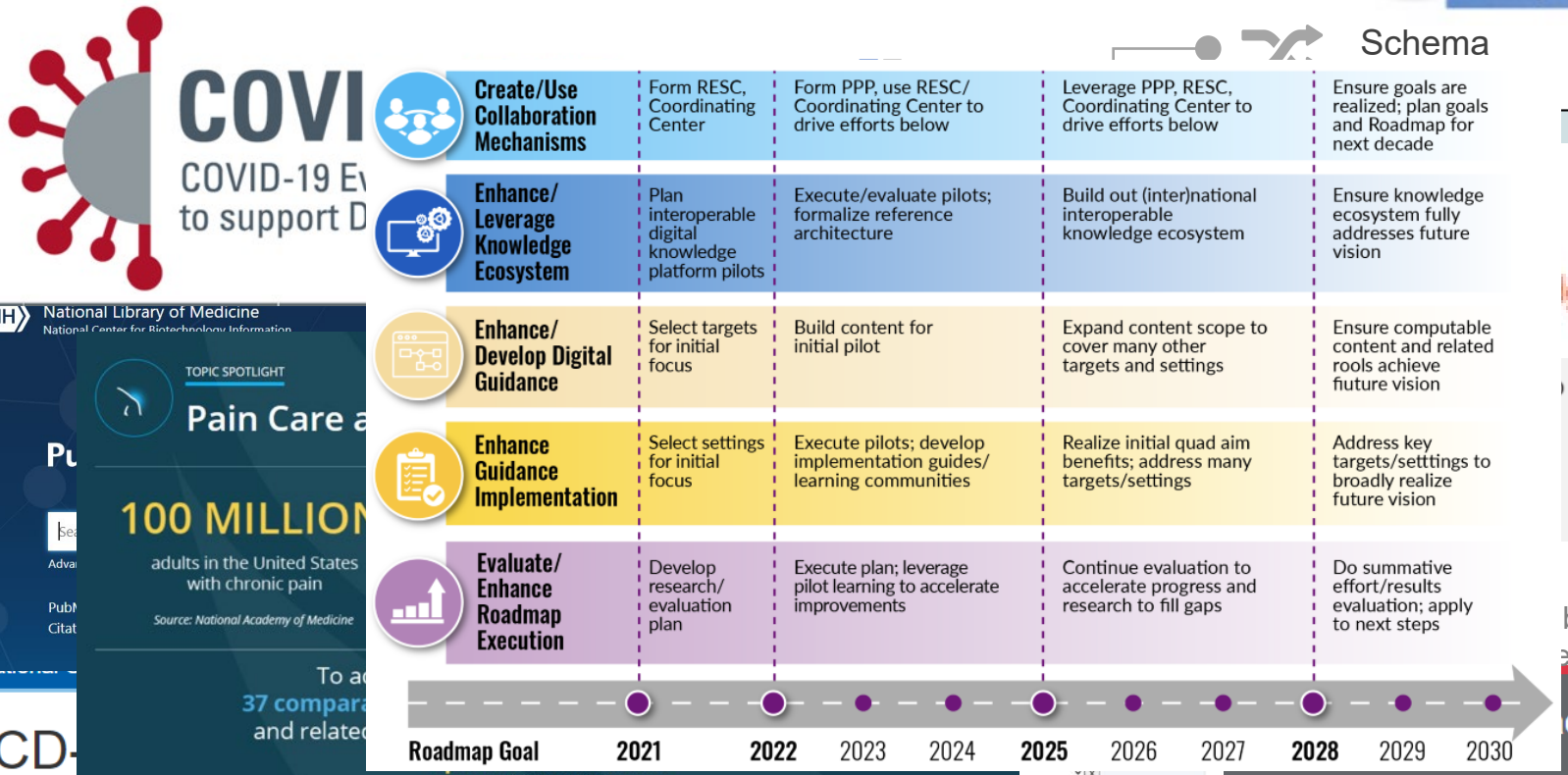
Terminology

orm
Common vocabulary
and code systems

edical Subject Headings

ICD-

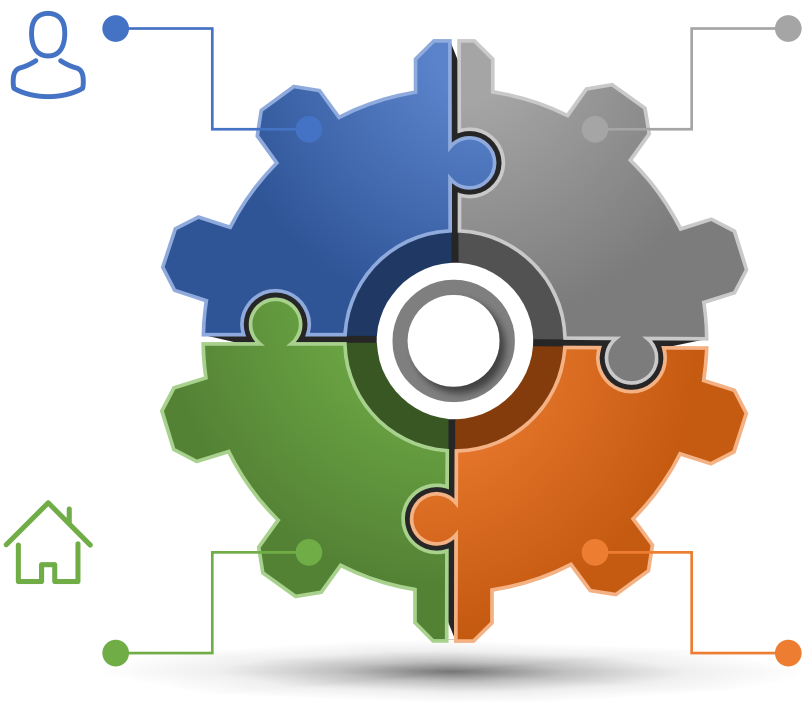
Applying Standards to a Domain



Applying Standards to the EVIDENCE Domain

Specific content and people

Contextualized application for each instance



Schema

Common format for how data elements are expressed

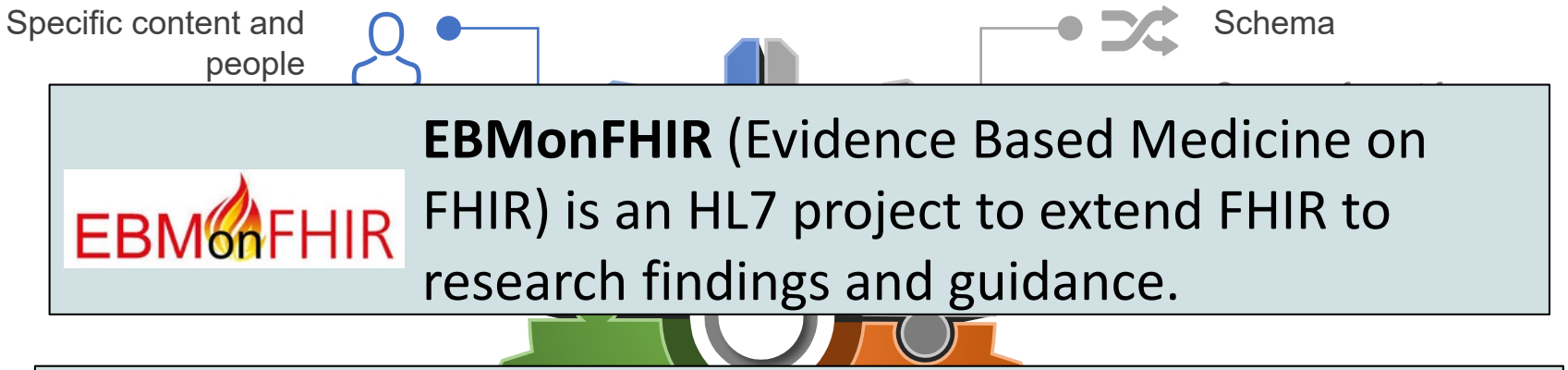
Tooling

Common interfaces (UIs and APIs) and data transformations

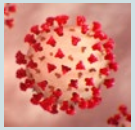
Terminology

Common vocabulary and code systems

Applying Standards to the EVIDENCE Domain



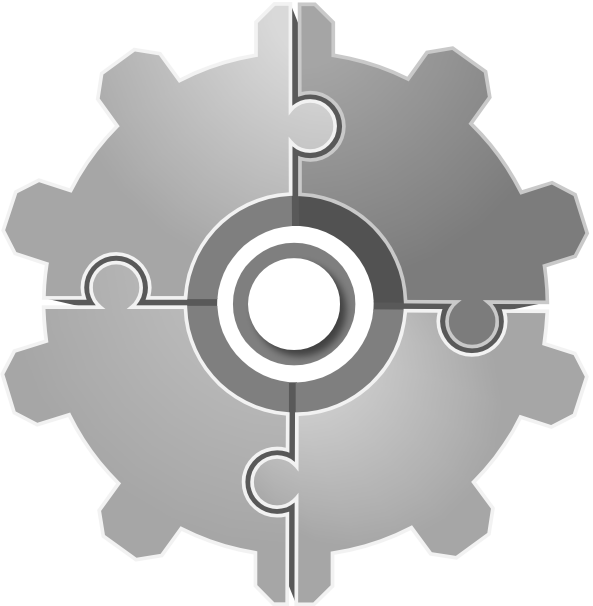
EBMonFHIR (Evidence Based Medicine on FHIR) is an HL7 project to extend FHIR to research findings and guidance.

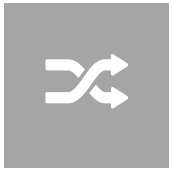


COKA

COVID-19 Knowledge Accelerator (COKA) is an open virtual organization developing standards for machine-interpretable expression of scientific evidence. COKA is a massive acceleration of an EBMonFHIR project to extend the Fast Healthcare Interoperability Resources (FHIR) standard to the expression of scientific evidence (variable definitions, statistics, and certainty of findings). COKA is facilitating implementation of evidence-related FHIR resources across efforts to identify, evaluate and report COVID-19 evidence.

Applying Standards to the EVIDENCE Domain





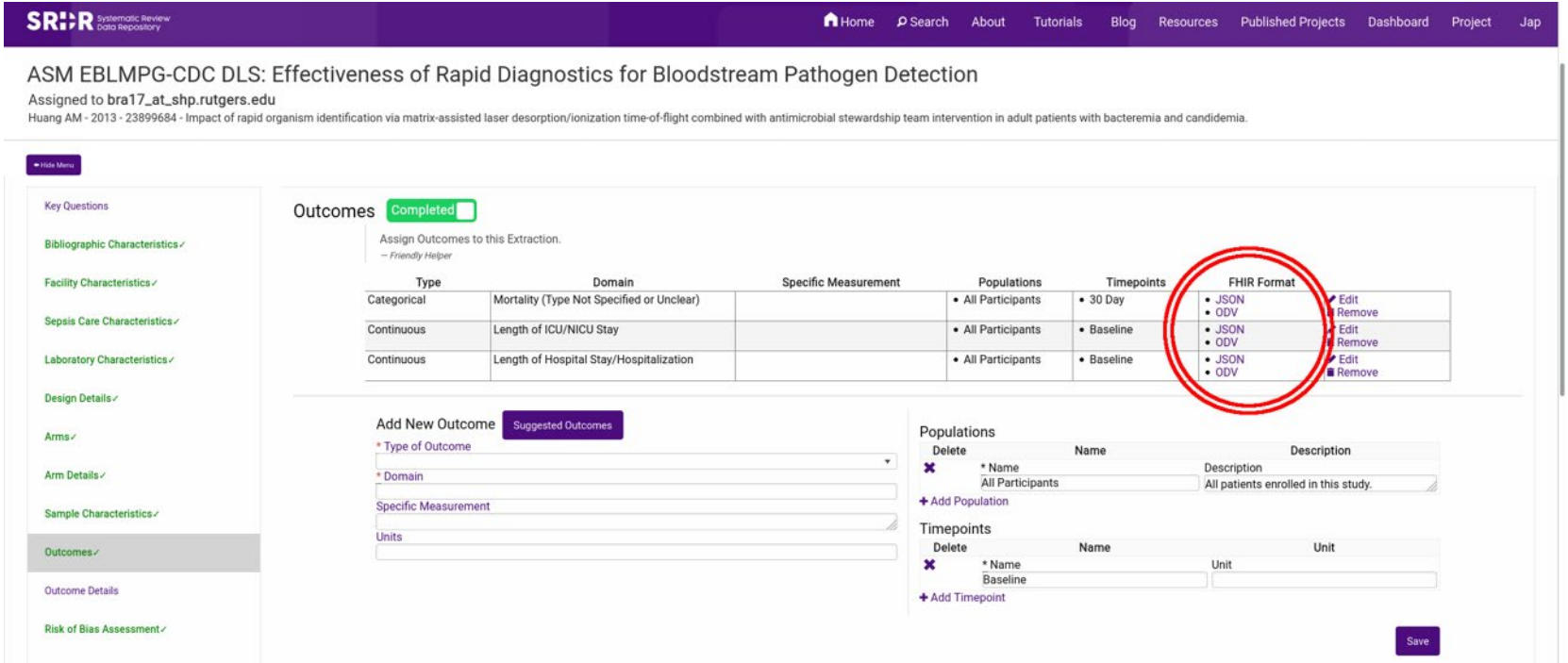
Schema

Common format for how data elements are expressed

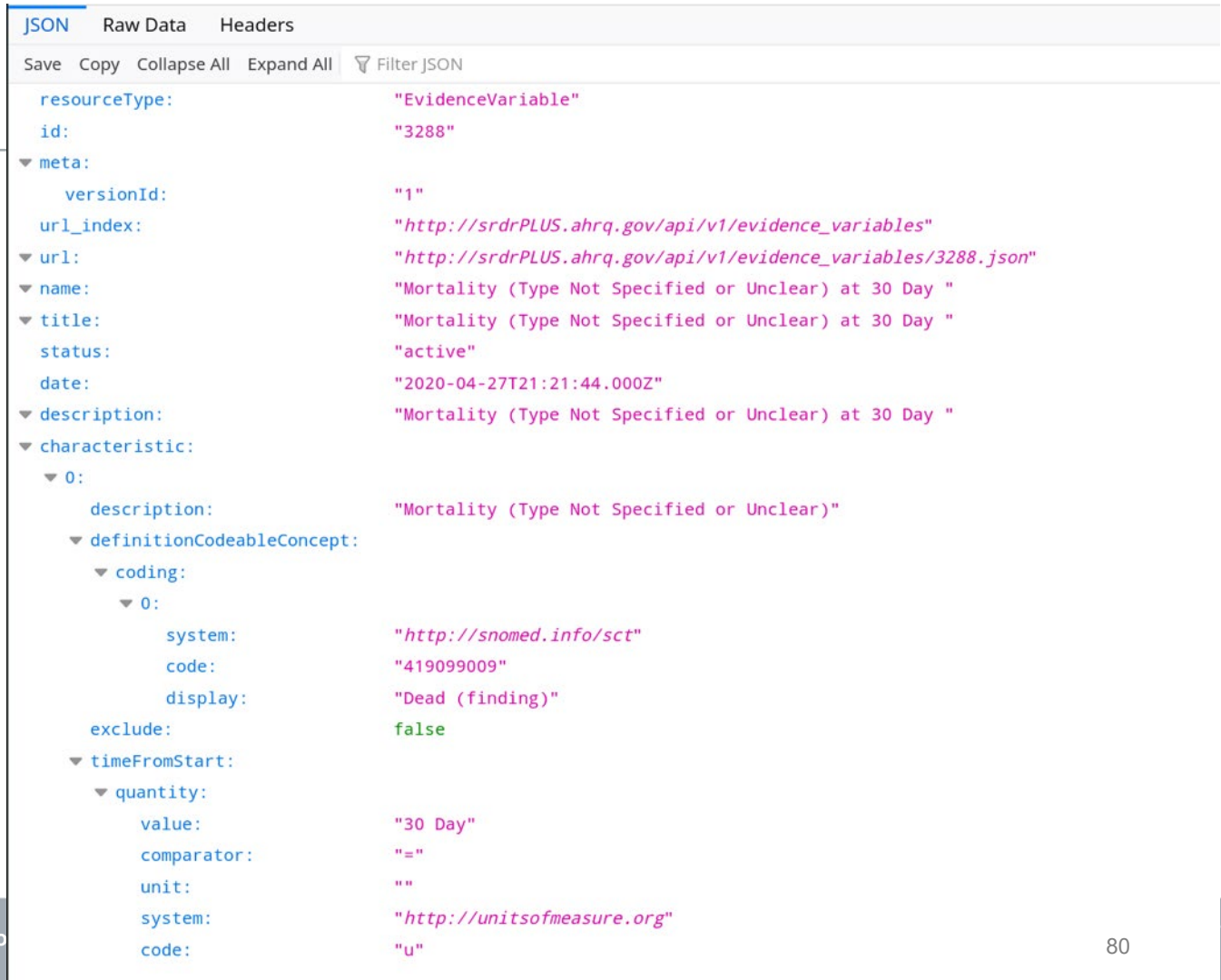
FHIR Citation Resource
FHIR Evidence Resource
FHIR EvidenceVariable Resource
FHIR EvidenceReport Resource

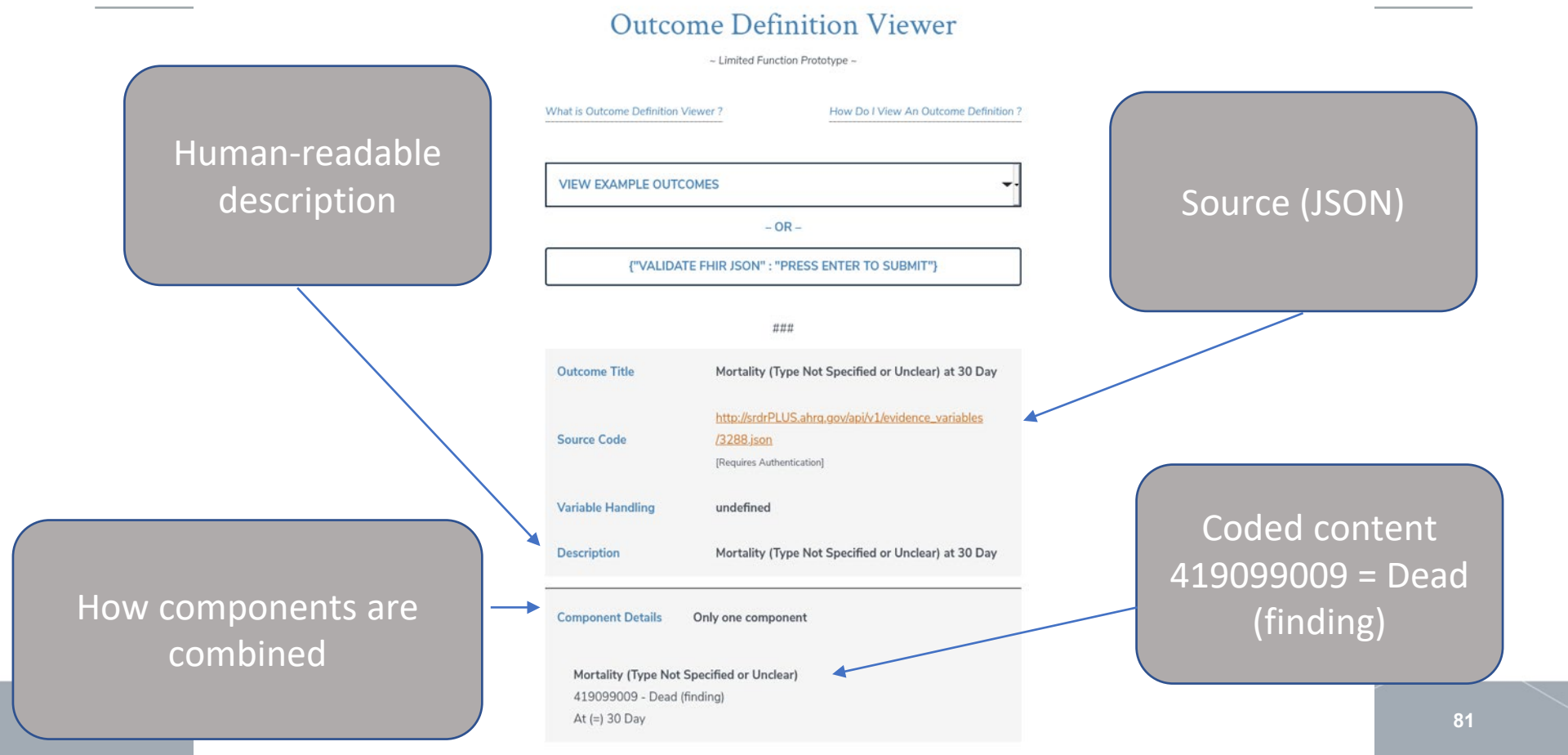
Example: SRDR+ transforms data defining an outcome to a FHIR EvidenceVariable Resource

SRDR+ Definition of 30-day Mortality



FHIR JSON Definition of 30-day Mortality





Human-readable description

Source (JSON)

How components are combined

Coded content 419099009 = Dead (finding)

Get Involved in COVID-19 Knowledge Accelerator

Specific content and people

Contribute to or get alerts from the Systematic Meta-Review of Steroid Therapy for COVID-19

Schema

Share changes to shape FHIR resources for evidence communication

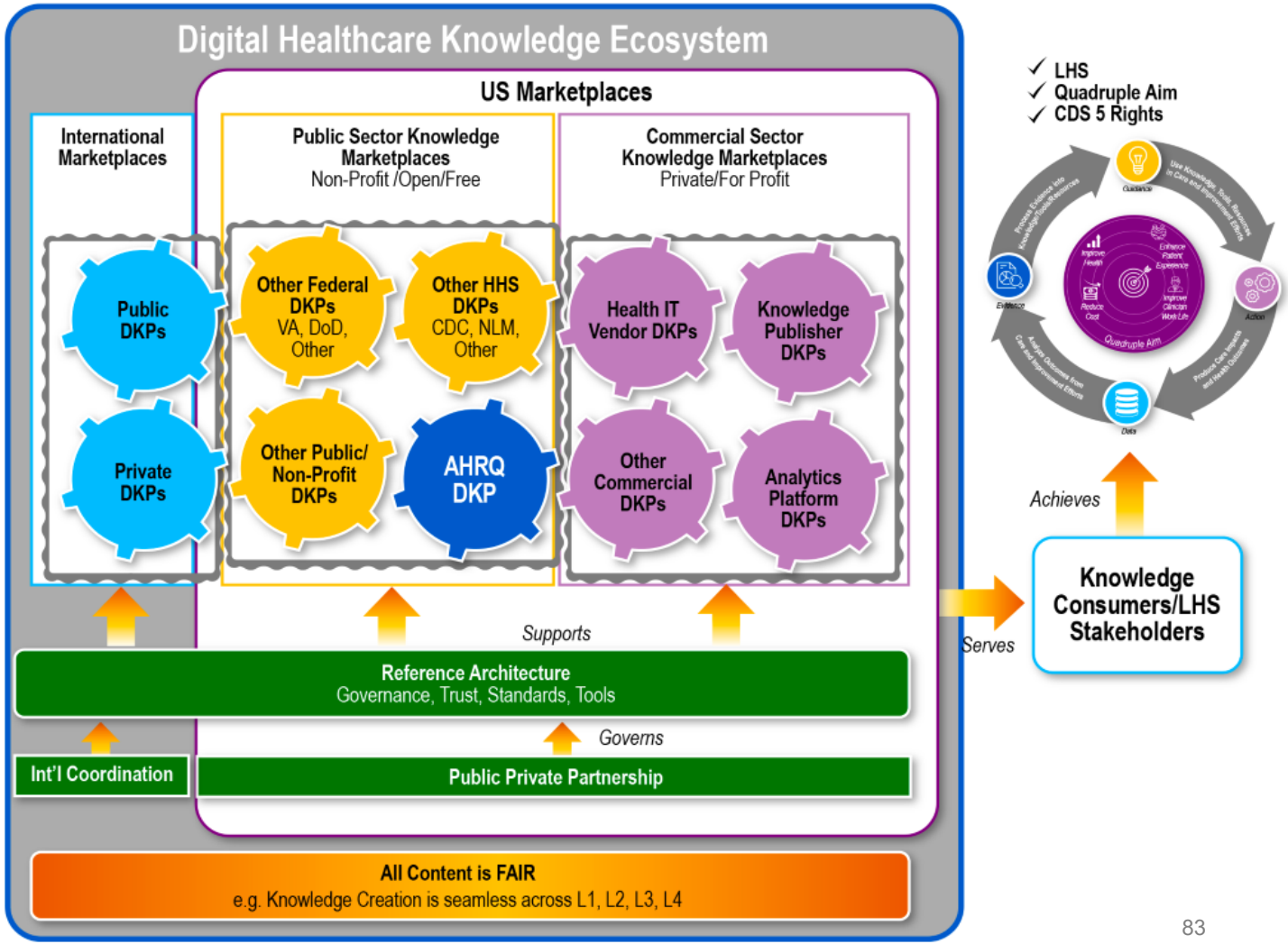
Tooling

Use Clinical Trial Results Reporter to express study results in computable form

Terminology

Join an Expert Working Group for Code System Development

Knowledge Ecosystem to Achieve ACTS Future Vision



DKP =
Digital Knowledge Platform

Recap

Common nonproprietary elements and approaches for knowledge processing can be leveraged to improve efficiency for all these efforts.

Join the COVID-19 Knowledge Accelerator:
https://tinyurl.com/coka2020

Questions? Email
balper@computablepublishing.com

INFORMATICS PROFESSIONALS. LEADING THE WAY.

A Multi-Stakeholder Roadmap for Care Transformation – the AHRQ evidence-based Care Transformation Support (ACTS) Initiative Session Number – S43

Speaker: **Blackford Middleton, MD, MPH, MSc, FACP, FACMI, FHIMSS, FIAHSI**

Institution: Apervita, Inc., Chicago, IL

Twitter: @bfm email: Blackford.Middleton@Apervita.com

#AMIA2020

Disclosure

Employee and Stockholder:	Apervita, Inc.
Stockholder:	Veravas, Inc.
Grant funding:	NCI, ONC, AHRQ

Learning Objectives

After participating in this session the learner should be better able to:

1. Understand in principle the steps to translate knowledge from a clinical guideline into computable knowledge for use in care
2. Understand in principle the benefits from using a standards-based approach to knowledge representation to promote knowledge sharing and re-use
3. Understand in principle the value of distributing computable knowledge artifacts via the cloud as web services and applications.

Overview

- Why is it so hard to transform care even with the best Health IT?
- Creating shareable and computable knowledge artifacts at scale
- Lessons learned in the CDS Consortium, Covid-19
- Toward a Learning Health System with shareable CDS and cognitive support

2011 2012 2013 2014 2015

2011 – 2012: Data Capture and Sharing
- Accelerated adoption
- Data capture and exchange

2013 – 2014: Demonstrate Health System Improvement
- Widespread adoption and data exchange
- Process improvement

2015+: Transform Health Care and Population Health through Health IT
- Demonstrated improvements in care, efficiency, and population health
- Breakthrough examples of delivery and payment reform

Beyond 2015: Transformed Health Care

Enhanced ability to study care delivery and payment systems

Empowered individuals and increased transparency

Improved care, efficiency, and population health outcomes

STRATEGIC GOALS

- Achieve Adoption and Information Exchange through Meaningful Use of Health IT
- Improve Care, Improve Population Health, and Reduce Health Care Costs through the Use of Health IT
- Inspire Confidence and Trust in Health IT
- Empower Individuals with Health IT to Improve their Health and the Health Care System
- Achieve Rapid Learning and Technological Advancement

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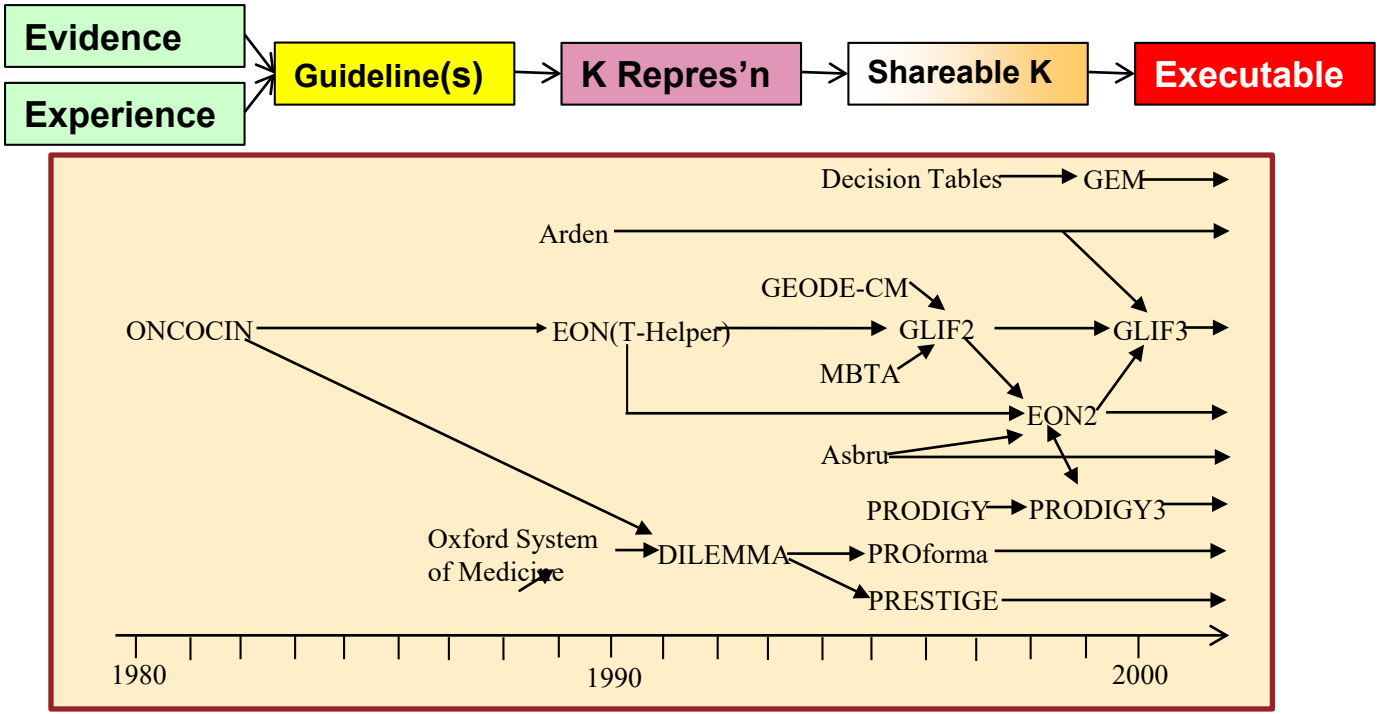
The Central Problem

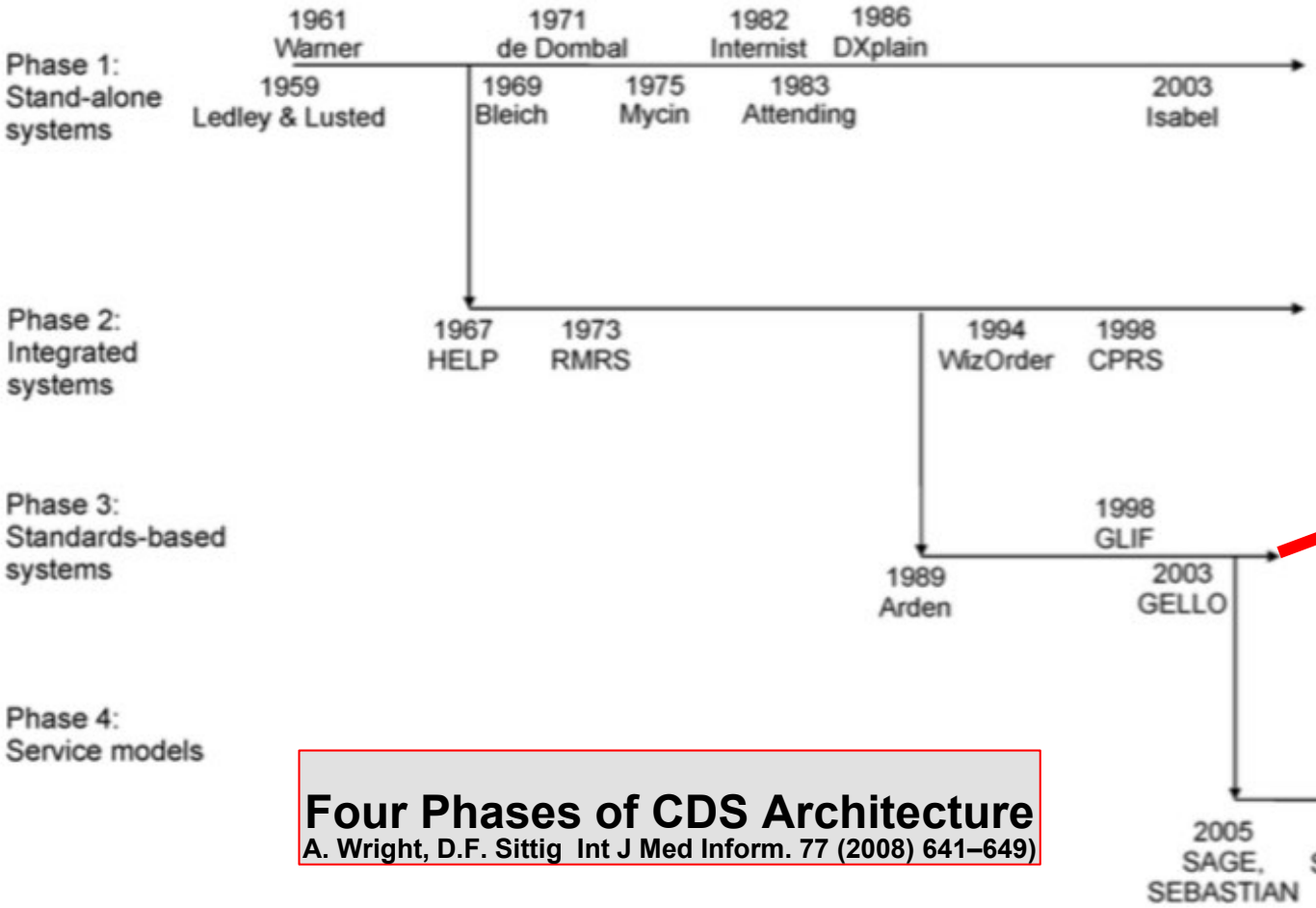
Why is it so hard to transform care with even the best health IT?

Simply put: the chasm which exists between published knowledge and clinical experience, and implemented knowledge in health IT, is too wide for the average clinician or healthcare delivery organization to manage.

Knowledge Representation and Sharing is Hard



P. L. Elkin, M. Peleg, R. Lacson, E. Bernstam, S. Tu, A. Boxwala, R. Greenes, & E. H. Shortliffe. Toward Standardization of Electronic Guidelines. *MD Computing* 17(6):39-44, 2000



Four Phases of CDS Architecture
A. Wright, D.F. Sittig Int J Med Inform. 77 (2008) 641–649)

Fig. 1 – A schematic drawing of the four-phase model for clinical decision support.

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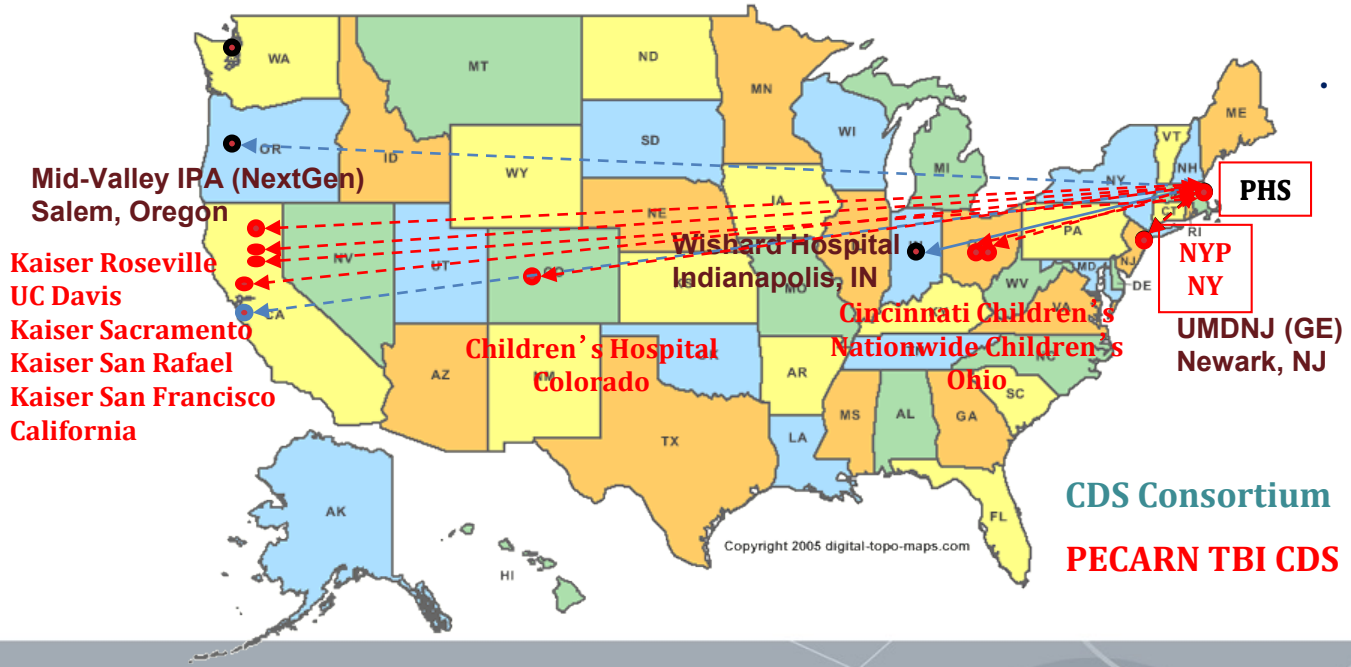
Toward A SOA for CDS

HeD KAS
FHIR
SMArt

CDS Consortium, OpenCDS, Industry…

CDS Consortium Demonstrations: 2008-13

Toward a National Knowledge Sharing Service

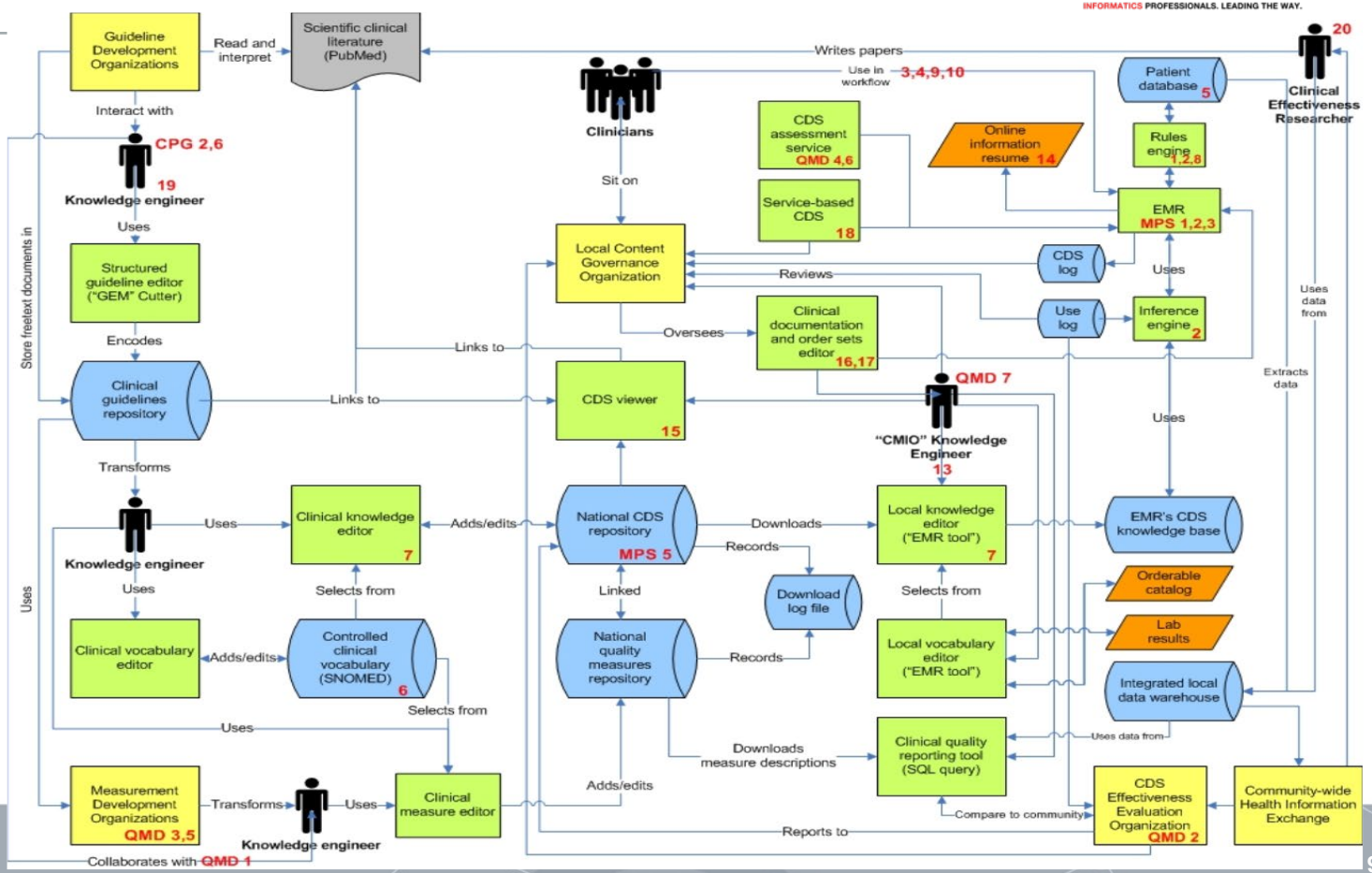


- **Clinical Decision Support Consortium**
  Middleton B, PI: 2008-13, AHRQ –funded: HHSA290200810010
- **Major accomplishments**:
  - Knowledge artifacts published: 11 clinical rules, 50+ classification rules and 375 immunization schedule rules
    - 8 clinical sites implemented using 5 different EHRs
    - More than 240 users utilize CDS services
    - Established legal framework for collaboration
    - Since 2010 more than 1.7M CCD transactions were processed
    - 31 entities (companies and academics) in a pre-competitive environment
    - Contributed to ONC-sponsored Health-e-Decisions efforts: KAS 1 and KAS 2

Vision: The National Knowledge Ecosystem

1. Guideline Development
2. Knowledge Translation, Specification
3. Content Governance
4. Knowledge Implementation
5. Use, Evaluation, and Feedback

Sittig DF, Wright A, Ash J, Turechek ZD, Middleton B. A Conceptual Architecture for National Standards-based Clinical Decision Support Integration and Syndication. Manuscript in preparation.



Vision: The National Knowledge Ecosystem

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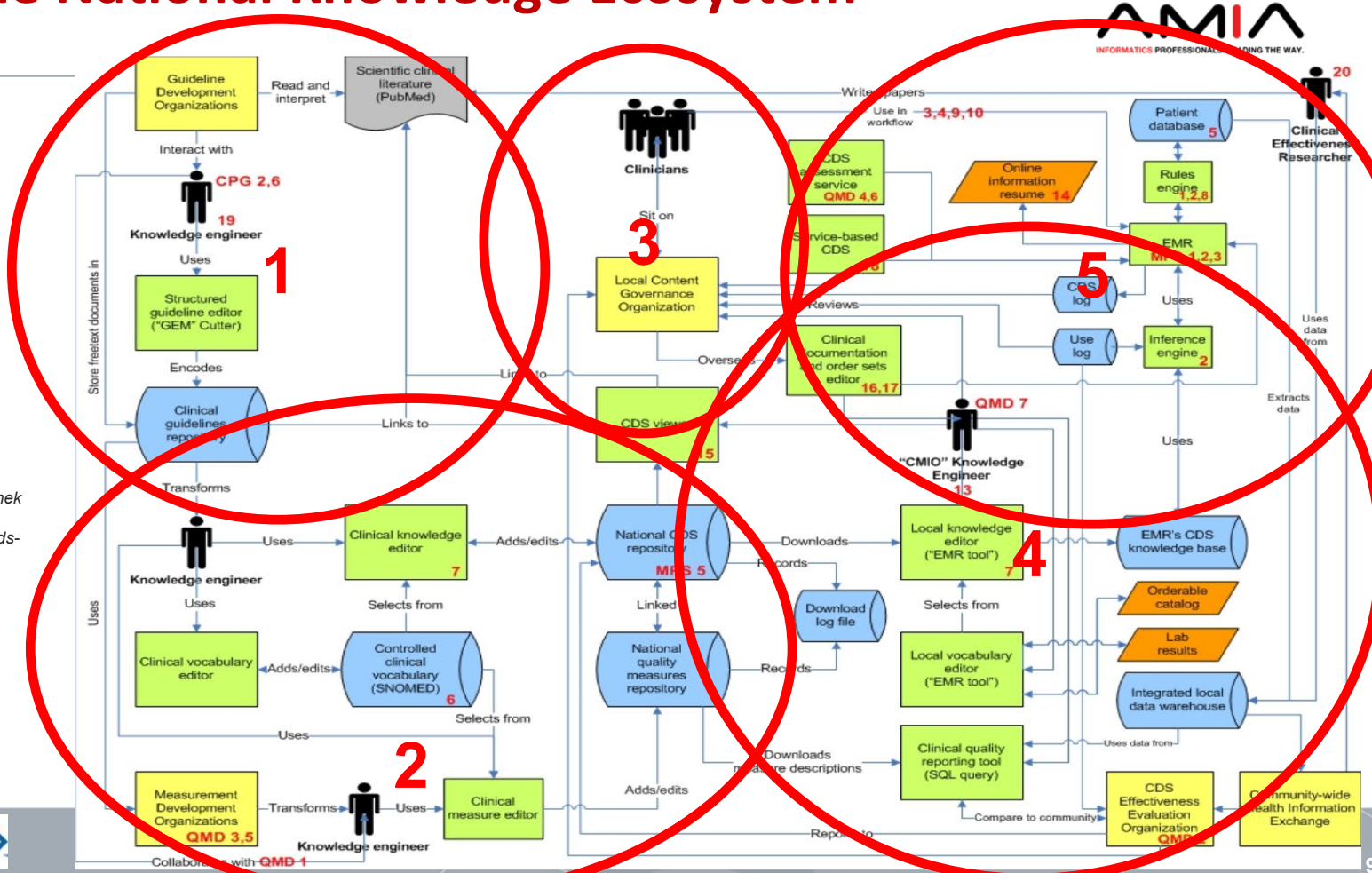
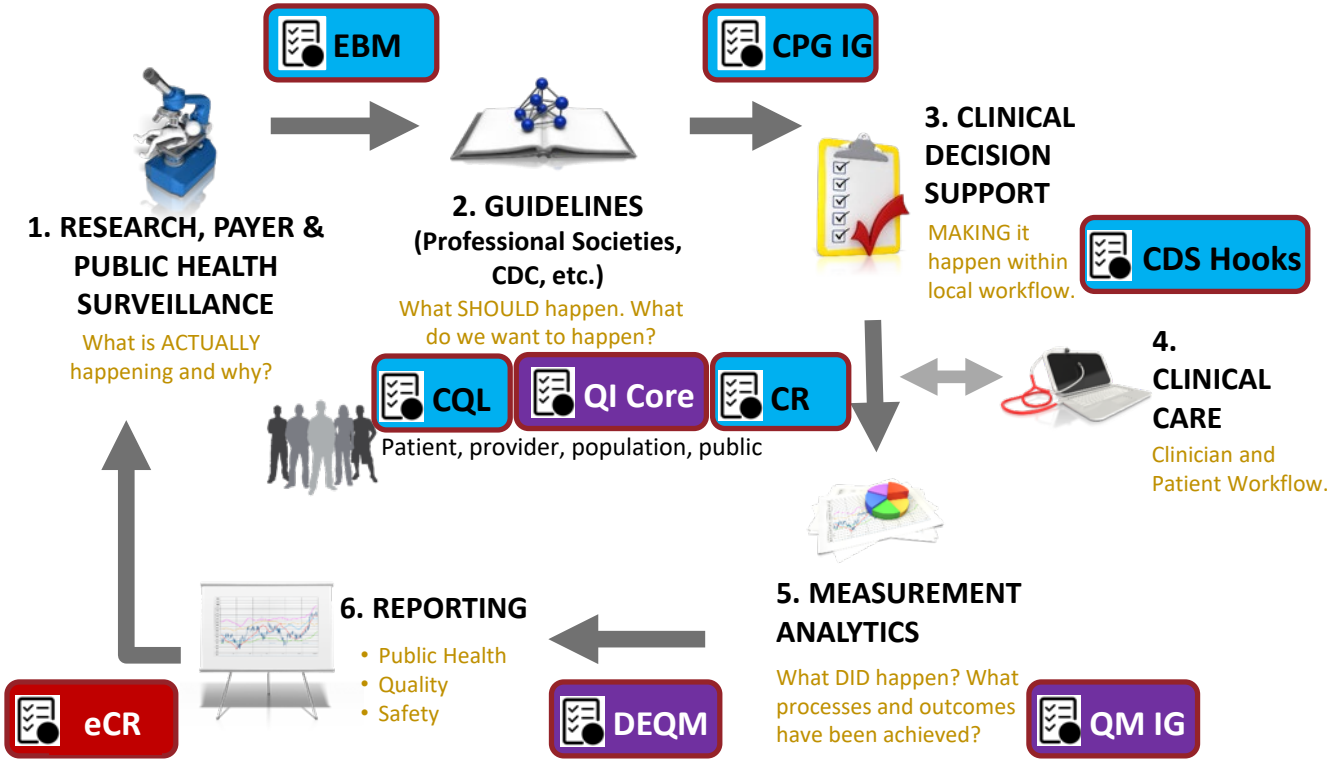


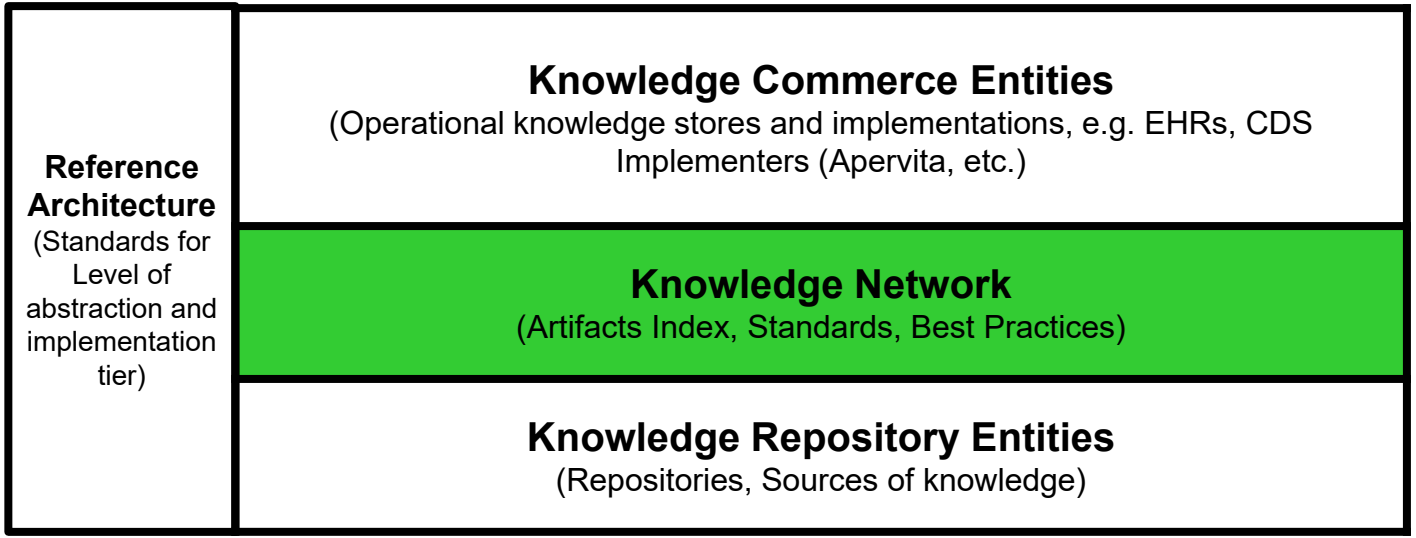
Sittig DF, Wright A, Ash J, Turechek ZD, Middleton B. A Conceptual Architecture for National Standards-based Clinical Decision Support Integration and Syndication. Manuscript in preparation.

HL7: Quality Improvement Ecosystem / Learning Health System



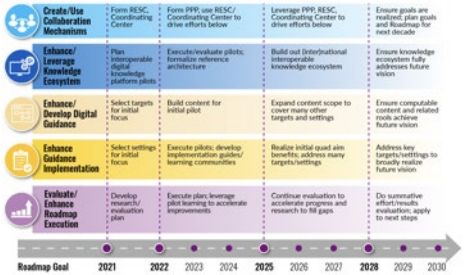
http://build.fhir.org/ig/HL7/cqf-recommendations/documentation-approach-01-main-page.html

A “Knowledge Network” is currently a Missing Layer in the CDS Ecosystem



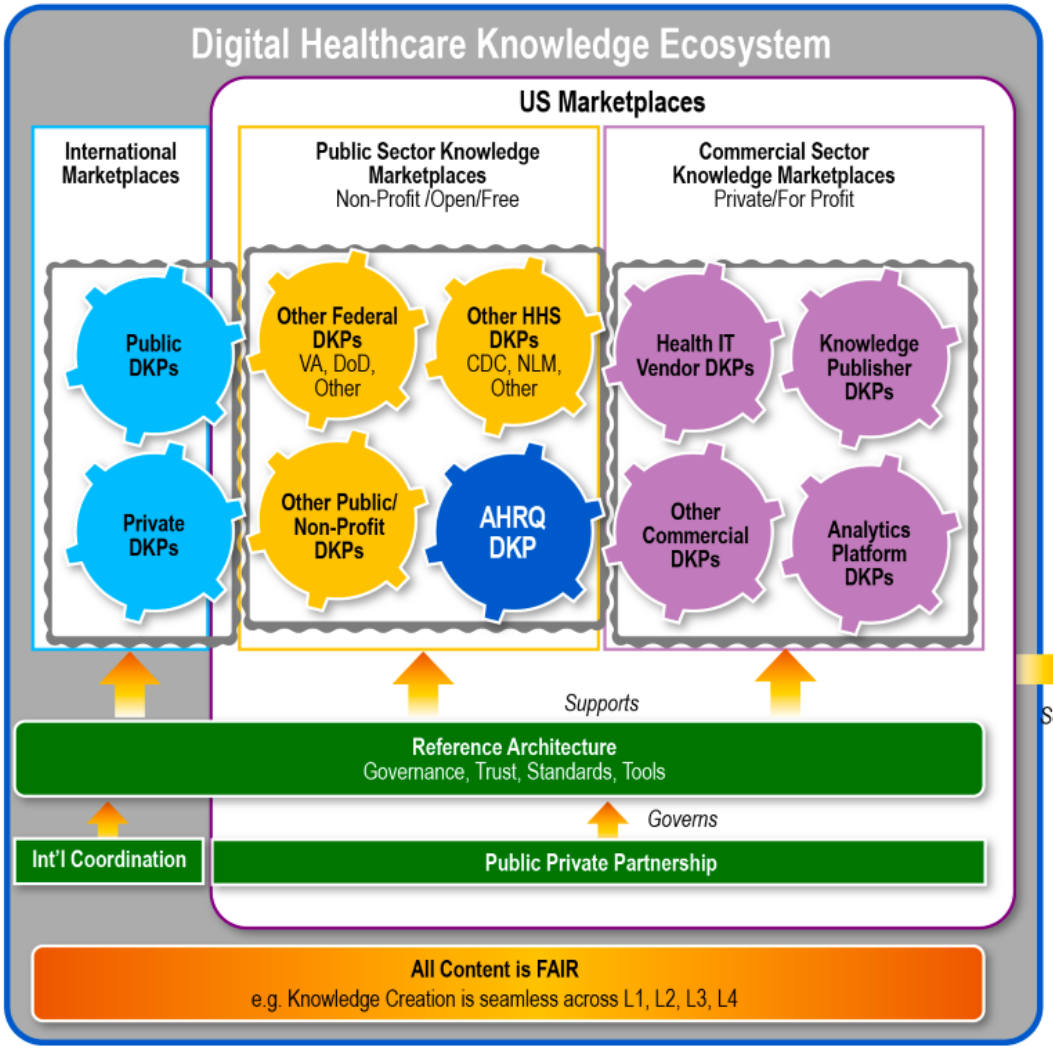
Richardson JE, Middleton B, Blumenfeld BH. A Funding Proposal for a Sustainable Knowledge Network to Support a More Effective CDS Ecosystem. Research Triangle Park, NC: RTI International; 2020 Jan p. 39. (Patient-Centered CDS Learning Network).

Knowledge Ecosystem to Achieve ACTS Future Vision



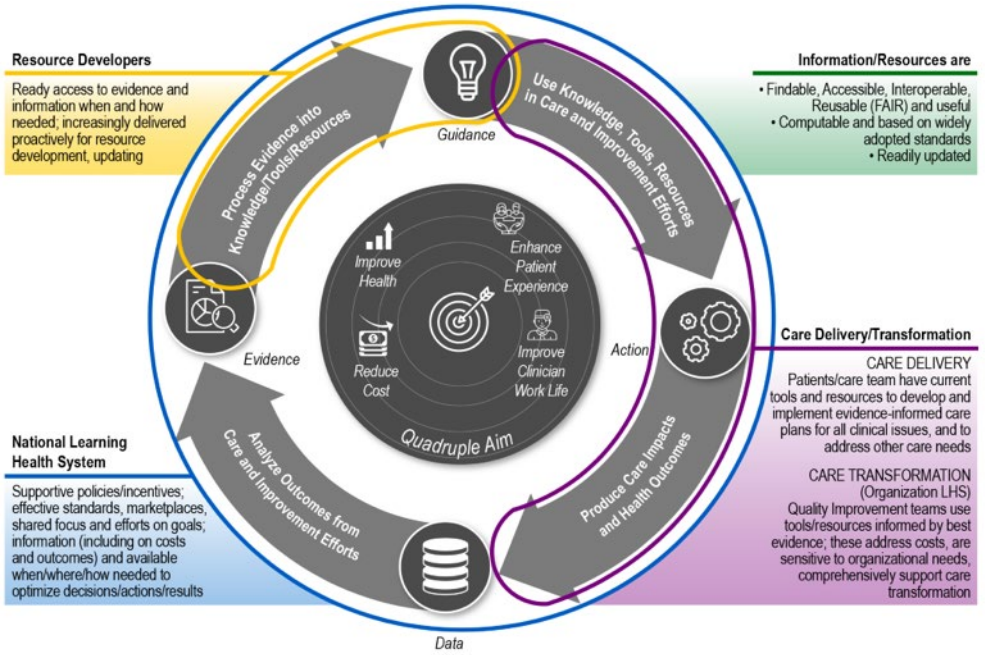
Roadmap to Achieve Vision

DKP = Digital Knowledge Platform



National Knowledge Ecosystem: Future State Goals

- **Rapid translation** of new knowledge (and updates) into practice
- **Mature ecosystem** of 'parts suppliers' for the knowledge supply chain
- **Comparability** of competing algorithms, cognitive aides, pathways
- **Trust** in knowledge artifacts, interpretability / explanation for recommendations
- **Rapid feedback** 'upstream' to participants in the knowledge ecosystem (suppliers, curators, authors



Covid-19: Agile KE Overview

Cross-functional, Integrated Team

- Agile CPG Team, Concurrent L1/2/3 Development

“Chunking” (composite artifacts)

- Progression of incremental, focused parts

Iteration, rapid-cycle feedback

- Together with incremental parts

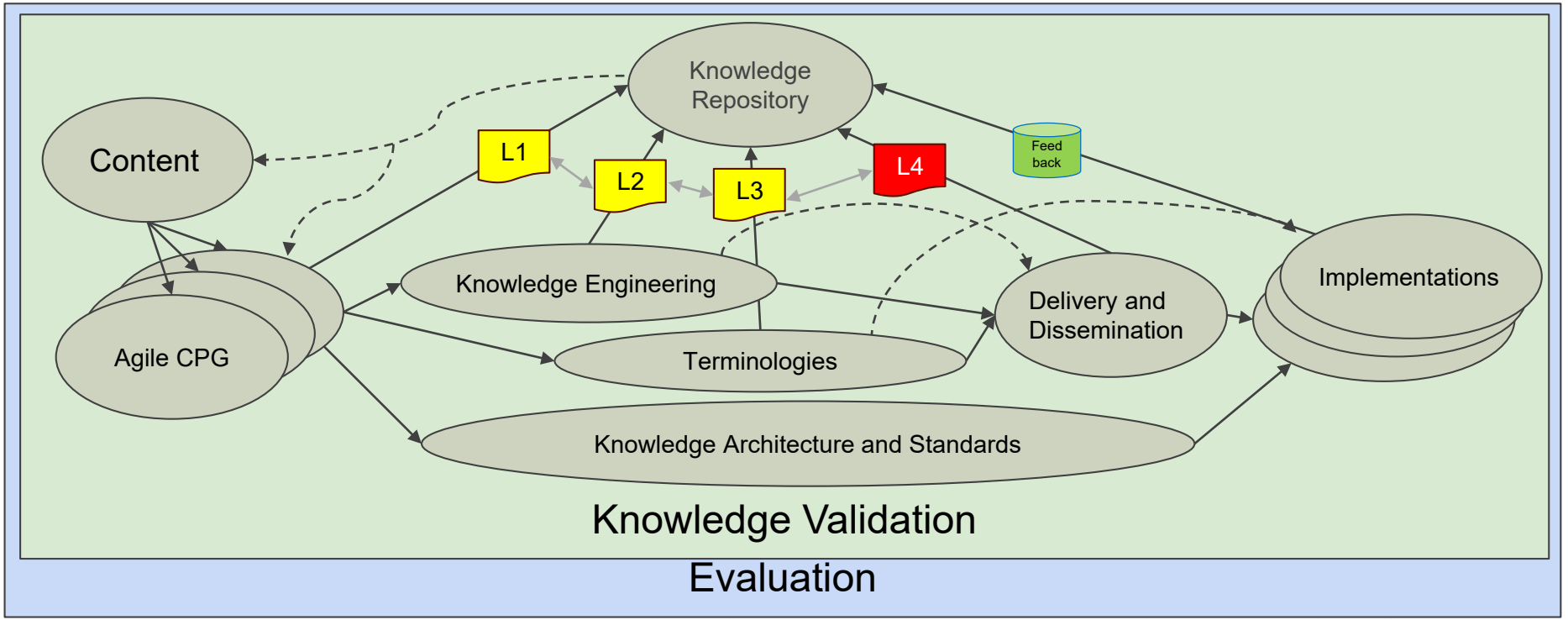
Test-driven Knowledge Engineering

- Specify by Example -> Incremental Testing -> Validation

Leverage Knowledge Base

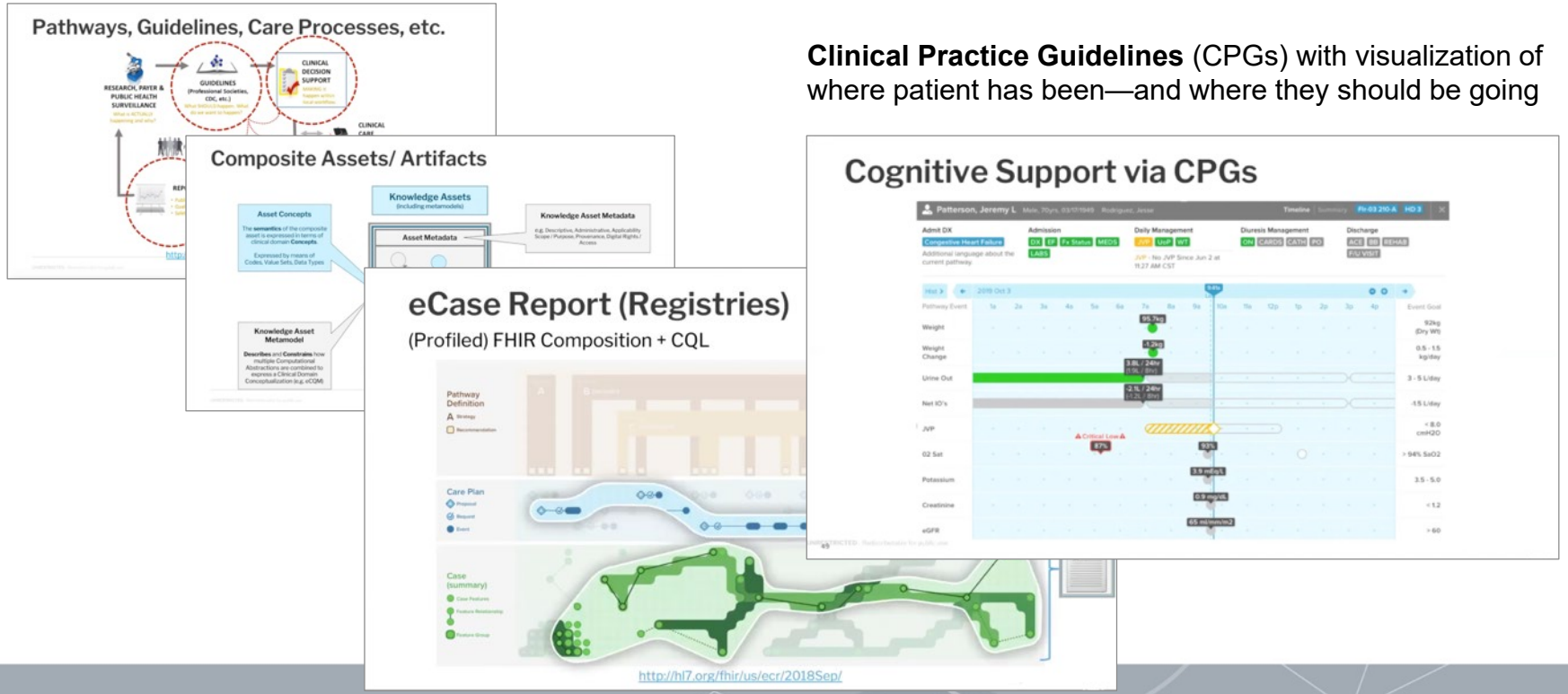
- ‘Intelligent’ Knowledge Content Management System

C19 Digital Guidelines WG: Agile Knowledge Engineering Work Flow



Apervita | Best Practices for Knowledge Execution and Delivery at the Point of Care

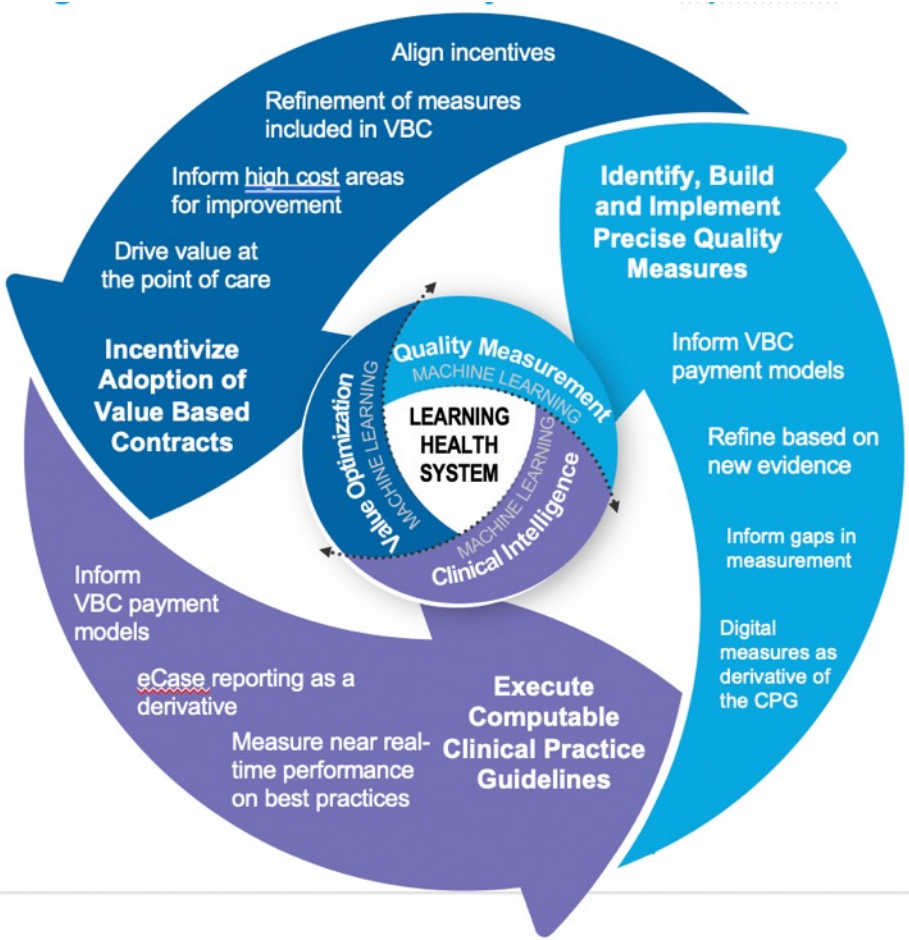
Pathway (HL7 CPG) delivered into workflow, delighting clinicians, & adding value



Clinical Practice Guidelines (CPGs) with visualization of where patient has been—and where they should be going

Apervita| Enabling the LHS

Apervita's Quality Measurement, Value Optimization, and Clinical Intelligence solutions work together to **continuously** make healthcare smarter and ultimately improve patient care



Our strategy brings to life elements from the Learning Health System built on the **interoperable near-frictionless flow of data and knowledge**

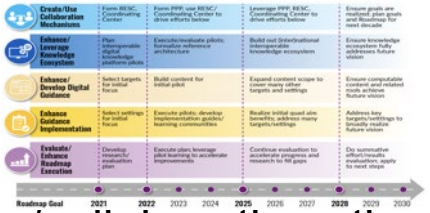
Thank you!

Blackford.Middleton@Apervita.com

Discussion (Following Poll Questions)

Sample Topics for your Input:

- Does the future vision and Roadmap (coordinated effort to address 5 goals [*collaboration, ecosystem, guidance development and implementation, evaluation/research*]) seem valuable for your efforts?
  - If so, how?



- Are there ways your organization can benefit from actions/collaborations the panelists are pursuing?
  - If so, what/how?
- How could any subsequent activities to execute the ACTS Roadmap most benefit your organization?
- Are there ways you or your organization could contribute to further Roadmap execution?

To reach ACTS Team: support@ahrq-acts.org